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ORIGINAL COMMUNICATIONS.

I.

BIOGRAPHICAL SKETCH *of the late Honourable CAD-
WALLADER COLDEN, formerly Lieutenant-Governor of
New-York, with an account of his writings.*

(See the annexed Engraving.)

THIS truly eminent and worthy character, who united in himself the several qualities we are accustomed to admire in the physician, naturalist, and philosopher, was the son of the reverend Alexander Colden, of Dunse in Scotland, and was born on the 17th day of February, 1688. After he had laid the foundation of a liberal education under the immediate inspection of his father, he went to the university of Edinburgh, where in 1705 he completed his course of collegiate studies. He now devoted his at-

tention to medicine and mathematical science until the year 1708, when being allured by the fame of William Penn's colony, he came over to this country about two years after. He practised physic with no small share of reputation till 1715, when he returned to England. While in London, he was introduced to that eminent philosopher Dr. Edmund Halley, who formed so favourable an opinion of a paper on Animal Secretion, written by Dr. Colden in early life, that he read it before the Royal Society, the notice of which it greatly attracted. At this time he formed an acquaintance with some of the most distinguished literary and scientific characters, with whom he ever after maintained a regular correspondence. From London he went to Scotland and married a young lady of a respectable Scotch family by the name of Christie, with whom he returned to America in 1716.

In 1718, he settled in the city of New-York ; but soon after relinquished the practice of physic, and became a public character : he held in succession the office of surveyor-general of the province, master in chancery, member of the council, and lieutenant-governor. Previously to his acceptance of this last station, he obtained a patent for a tract of land, designated by the name of Coldenham, near Newburgh, in this state, at which place he retired with his family about the year 1755, where he spent a great part of his life. Here he appears to have been occupied without interruption in the pursuit of knowledge, particularly in botanical and mathematical studies, at the same time that he continued his correspondence with learned men in Europe and America.

In 1761, he was appointed lieutenant-governor of New-York, which commission he held until the time of his decease, the administration of the government repeatedly falling on him by the death or absence of several governors in chief. His political character was rendered very conspicuous by the firmness of his conduct during the violent commotions which preceded the revolution. His administration is also memorable among other things for several charters of incorporation for useful and benevolent purposes. After the return of governor Tryon, in 1775, he was relieved from the cares of government. He then retired to a seat on Long-Island, where a recollection of his former studies and a few select friends, ever welcomed by a social and hospitable disposition, cheered him in his last days. He died in the 89th year of his age on the memorable 28th of September, 1776, a few hours before the city of New-York was in flames, retaining his senses to the last, and expiring without a groan.

Dr. Colden began at an early period of his life, to pay great attention to the vegetable productions of America, in which delightful study his daughter afterwards became distinguished, and in honour of whom Linnæus named a plant of the tetrandrous class, *Coldenia*. This plant Miss Colden had first described. He was attentive to the physical constitution of the country, and left a long course of diurnal observations on the thermometer, barometer, and winds. He also wrote a history of the prevalent diseases of the climate, and if he was not the first to recommend the cooling regimen in the cure of fevers, he was certainly one of its earliest and warmest advocates, and opposed with great earnestness, the then prevalent mode of treatment in the small pox.

In the years 1741 and 2, a fever which occasioned great mortality, prevailed in the city of New-York and created much alarm. He communicated his thoughts to the public on the most probable method of curing the calamity, in a small treatise on the occasion, in which he enlarged on the pernicious effects of marshy exhalations, moist air, damp cellars, filthy stores, and dirty streets: showed how much these nuisances prevailed in many parts of the city and pointed out the remedies. The corporation of the city presented him their thanks, and established a plan for draining and clearing out the city, which was attended with the most salutary effects. He published a treatise "On the Cure of Cancer." Another essay of his "On the Virtues of the Great Water Dock," introduced him to an acquaintance with Linnæus. In 1753, he published some observations on an epidemical sorethroat, which appeared in Massachusetts in 1735, and had spread over a great part of North America. These observations are to be found in Cary's American Museum.

When he became acquainted with Linnæus' system of botany he applied himself with new delight to that study. His descriptions of between three and four hundred American plants, were printed in the *Acta Upsaliensia*. He published the "History of the Five Indian Nations," in 2 vols. 12mo. But the subject which drew Dr. Colden, at one time of his life, from every other pursuit, was what he first published under the title of *The Cause of Gravitation*, which being much enlarged, was republished by Dodsley, in 1751, in 1 vol. 4to. entitled, *The Principles of Action in Matter, &c.*

This book cost him many years of close and severe study.

Though his principal attention after the year 1760 was necessarily directed from philosophical to political matters, yet he maintained with great punctuality his literary correspondence, particularly with Linnæus of Upsal, Gronovius of Leyden, Drs. Porterfield and Whytte of Edinburgh, Dr. Fothergill and Mr. Collinson, F. R. S. of London. There were also several communications on mathematical and astronomical subjects between him and the earl of Macclesfield. With most of the eminent men of our own country he held an almost uninterrupted epistolary correspondence. Among them we may mention the names of Dr. Garden, Mr. J. Bartram, Dr. Douglass, Dr. John Bard, Dr. Samuel Bard, James Alexander, Esq. and Dr. Franklin. With Dr. Franklin in particular he was a constant and intimate correspondent, and they regularly communicated to each other their philosophical and physical discoveries, especially on electricity. In their letters are to be observed the first dawnings of many of those discoveries which Dr. Franklin has communicated to the world and which so much astonished and benefited mankind. In a letter to one of his friends Dr. Franklin gives an account of the organization of the American Philosophical Society, in which he mentions that Dr. Colden first suggested the idea and plan of that institution.

The numerous manuscript papers left by Dr. Colden at the time of his death, and which for many years were supposed to have been lost, have been lately found, and are now in the possession of his grandson, Cadwallader D. Colden, Esq. attorney-general for the southern district of this state. They are chiefly on historical and philosophical subjects, and many of them are of the greatest value. Among these are observations on Smith's

History of New-York, in a series of letters to his son, Alexander Colden. An Introduction to the Study of Philosophy. A corrected copy of his Account of the Fever which prevailed in New-York, in the years 1741-2*. An Inquiry into the Principles of Vital Motion. A Translation of the Letters of Cicero, with an Introduction by C. Colden. *Plantæ Coldenhamiæ in provincia Noveboracensi spontanea crescentes quas ad methodum Linnæi Sexualem, anno 1742, observavit Cadwallader Colden.* A corrected and augmented copy of his Principles of Action in Matter. A Treatise on Electricity, &c. Besides these there is a great mass of correspondence on medical, philosophical, and literary subjects. A correspondence with Dr. Benjamin Franklin, from the years 1740 to 1757—with Linnaeus from 1747 to 1751. With Gronovius from 1743 to 1755—with Dr. Garden, of South-Carolina, from 1748 to 1768—with Dr. W. Douglass, of Boston, from 1720 to 1747—with J. Bartram, of Pennsylvania, from 1742 to 1774—with Dr. Whytte from 1758 to 1763 :—Letters to Dr. John Bard from 1747 to 1764, on the small-pox—correspondence with J. Alexander, of New-York, on the King's Council, from 1747 to 1764—with Mr. Collinson, of London, from 1740 to 1769—with the earl of Macclesfield. In addition to all these, there are the manuscript copies of the works he has published, and innumerable letters to and from very celebrated persons of Europe as well as in America. These carry his correspondence back as far as the year 1710, and bring it down, almost uninterruptedly, till the time of his death. There are, too, a great variety of papers on public affairs, which must be considered as documents of primary im-

* See the third article of the present number of the Register.

portance, as they necessarily contain numerous facts which throw light on the history of this state. Dr. Colden was unquestionably a man of various and extensive learning, of superior talents, of the most indefatigable industry, and, indeed in many respects, his character will not suffer by a comparison with that of our illustrious countryman, Benjamin Franklin.

We are happy to announce that Cadwallader D. Colden, Esq. intends, ere long, to offer to the public a biographical account of his venerable grandfather, together with a selection of the most important of his writings. Such a work cannot fail to meet with a hearty reception from the American people, and to afford another and durable monument of the talents, industry, and various acquirements of this celebrated physician and philosopher. It is proper, however, to add, that through the kindness and liberality of Mr. Colden, the editors are put in the possession of many highly interesting articles for publication, written by Dr. Colden, and that they will be given to the public through the medium of the Register.

Those who are desirous of obtaining farther particulars relative to this distinguished character will consult the American Museum, vol. 3d. the American edition of Dr. Rees's Cyclopædia, Hardie's Biographical Dictionary, the Port Folio, new series, vol. 3d. Dr. Miller's learned Retrospect of the 18th century, and the excellent New Biographical Dictionary of William Allen, lately published.

II.

ACCOUNT of the CLIMATE and DISEASES of New-York,
by CADWALLADER COLDEN, Surveyor-General of the
Province. Communicated to the Editors by his Grandson,
*C. D. Colden, Esq.**

THE city of New-York lies nearly in 40 deg. and 40 min. of North latitude, and about five hours west from London. The climate partakes of the extreme climates: sometimes the summer is as hot as in the torrid zone, and the winter often is not less cold than in the northern parts of Europe. The heat and cold depend very much upon the winds, and, for that reason, in the same season of the year, are very various. In the summer, when the wind blows from the north-west (which frequently happens) the air is agreeably cool, but in the winter it is piercing cold. A southerly and south-westerly wind, if it continue any

* The present article gives an account of the climate and of the diseases of this city as they prevailed here almost ninety years ago; and as we have but very few observations relative to our country of a similar kind, and written at so early a period, the editors have considered it worthy insertion in the Register; as introductory to the author's celebrated paper on the fever of 1741-2, it is particularly deserving of attention. And by those philosophers who have so strenuously contended that an amelioration in the temperature of our climate has taken place, in a regular and constant ratio with our numerous settlements and extensive improvements, the remark of Dr. Colden, when he says, he "doubts not it will in time become one of the most agreeable and healthy climates on the face of the earth," will be considered as correct, and corroborated by common observation and experience.

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time, in summer, becomes very hot, and if we want winds, which sometimes happens in July and August, the air becomes sultry. Southerly winds in winter make the cold very moderate. We have much less rain or snow than in England, and the heaven is seldom overcast with clouds. The north-west wind being so extremely cold, even so far south as North-Carolina, I believe is owing to the high ridge of mountains which lies to the westward of Virginia, Maryland, Pennsylvania, and this province, though it be generally attributed to the great lakes which lie to the north-westward of this province : for it is observed in all other countries, that the winds which come from any great quantity of water, are not so cold as those that come from mountains, and are always accompanied with rain or moisture, whereas the north-west winds here are very dry ; besides, the winds from the lakes must be stopt in their course by these high mountains which lie betwixt us and the lakes. This is confirmed by what I am told by those who have continued some time in the Sennekas country near Iagara, on the west side of these mountains, that the north-west winds there are always accompanied with rain as the easterly winds are here.

Though there be so great a variety of weather in this country, the height of the mercury in the barometer does not suffer so great changes as in England. I have had a barometer by me about six years and never observed the mercury lower than 29 inches and 7 or 8 tenths of an inch, and it is generally betwixt 30 and 30 and an half inches high, though I have sometimes observed it 31 inches high, which is as high as it is ever observed in England or I think any where else ; but it is so high only in the time of very hard frost.

The spring is much later than in England : we perceive but very little of it before the latter end of April : March is generally cold and windy, though for the most part the latter end of February be mild and warm. The winds in March are generally northerly, and they as well as the cold are owing to the melting of the snow to the northward of us, for these winds are always preceded by some warm weather either in the latter end of February or beginning of March. The lateness of the spring is owing to the whole country being covered with wood, so that the sun cannot easily dissolve the snow which lies under the trees, or warms the earth. The lateness of the spring makes it short, the hot weather succeeding the cold very quickly. In the spring the people are subject to pleurisies and inflammatory fevers, as in all other countries, upon the breaking up of hard winters ; but not so much as in Pennsylvania and in the countries to the southward. The country people, and such as are most exposed to the cold, are most liable to these distempers. Perhaps the reason of the southern countries being more subject to pleurisies is, that in those countries the poorer sort are not so well cloathed and have not such warm houses as in this.

The summer begins in the end of May, and continues hot to the beginning of September. July and August are the most sultry months, and very often rainy. The air in these two months is always full of moisture, so much that the doors and windows are observed then to be more swelled than at any other time of the year, and iron rusts so much that it is difficult to keep any instrument clean which is made of that metal, though the weather be extremely hot at the same time. A far

greater quantity of dew likewise falls in these months than at any other time, and begins to fall a considerable while before sun-set. The mornings are frequently foggy, especially near the river and marshes, after sun-rising. This proceeds from the quantity of vapour which falls in the night, and is easily raised, but it is generally dissipated before ten in the morning. The heat in these months is a great deal more uneasy than in June, though a greater quantity of the sun's rays falls upon the earth in that month than in these. This is owing to the quantity of vapour in the air, which retains the heat and becomes in a manner scalding. For it is always observed that the heat is a great deal more uneasy before rain (though the sun does not shine clear) than it is after a shower, when it shines with its greatest brightness; and a burning-glass before rain does not burn so vehemently as it does after rain. If the air continues sultry after rain, we expect more rain speedily, or a great quantity of dew that night. The air is frequently fanned in the hot months with sudden gusts of north-west winds. They commonly arise in the afternoon, and blow violently for half an hour or a little more, with heavy showers of rain and thunder-claps, and leave the air agreeably cool and serene. When the country was first settled, these gusts were very frequent, hardly a day in the hot seasons passing without them: but now, since the country begins to be cleared, the summer is not so sultry, and these gusts are not near so frequent. They are likewise much more frequent in the provinces to the southward of us than in this.

The thermometer (mine is of Mr. Patrick's make) in the summer, within doors, where the sun cannot reach, is generally about 20, though at sometimes it is above 15, and at other times below 30. In June, I tried the difference

betwixt what it was in the house and the open air, where it was exposed to the sun's rays betwixt 2 and 3 in the afternoon, which is generally the hottest time of the day, and found the spirit rise 36 degrees, or parts, marked on the thermometer, above what it was in the house. The thermometer in the house stood at 26, and exposed to the sun rose 5 degrees above the place marked 0.

The months of July, August, and beginning of September are the most sickly months in the year; more people being sick and more children dying than in all the rest of the year. The epidemical diseases are intermitting fever, cholera morbus, and fluxes. The intermitting fevers are not near so frequent in this province as in those more to the southward, but I think fluxes are more frequent in this town than in Philadelphia. Two reasons may be assigned for this: first, the poor people at this time eat abundance of water-melons and other such kinds of fruit more than they do in Philadelphia: the other is, that the water in the town is not near so good as there, being brackish and so hard (as it is commonly termed) that it will not dissolve soap.

The fall in this country (and all over the main of America) is most agreeable from the beginning of September to the middle of November; the weather being mild and dry, the sky always serene, and the people healthy.

We reckon the winter from the middle of November to March, though the violent frosts do not usually begin till about Christmas, and then to the middle of February it is extremely cold; the great river, during that time, being frozen so hard, that horses and sleds pass daily upon it. However it does not every year freeze within several

miles of the city, but in that time there is often so much ice floating that it is not safe for vessels to go to sea or to come in. The winter is above six weeks longer at Albany than at New-York, that place being 160 miles further up Hudson's river. It is likewise longer at Philadelphia than here, though that town be above a degree and a half more to the southward. This is owing to that place being situated upon a fresh-water river, which more easily freezes, and to its distance from the sea.

The thermometer in the month of January is generally about 80. I observed it twice at 100, and once at 103 ; then the frost and cold were excessive : all liquors, except spirits, froze. I found Madeira wine (which is a very strong wine) frozen in the morning in a room where there had been a good fire all day till eleven at night. Hudson's river was then frozen over at the town, where it is about two miles broad and the water very salt, so that people passed over upon the ice in crowds ; but the ice did not continue fast at this place above three days. In the beginning of winter people are in danger of rheumatic pains, and in February of bastard pleurisies.

The air of the country being almost always clear, and its spring strong, we have few consumptions, or diseases of the lungs.* I never heard of a broken-winded horse in

* How shall we account for the extraordinary mortality occasioned by this disease at the present day ? If our climate at that early period was so conducive to health, and particularly well calculated for pulmonic affections, and if what change has been effected in it be for the better, we must attribute it principally to the increase of dissipation, and the great imprudence in dress, and not to what many have asserted, the very nature and vicissitudes of our seasons.

this country. People inclined to be consumptive in England, are often perfectly cured by our fine air, but if there be ulcers formed they die in a little time.

The climate grows every day better as the country is cleared of the woods, and more healthy, as all the people that have lived long here testify. This has even been sensible to me, though I have been but about twelve years in the country; I therefore doubt not but it will in time become one of the most agreeable and healthy climates on the face of the earth. As it is at present I prefer it to the climates of England, and I believe most people that have lived any considerable time here, and are returned to England, will confirm this.

III.

*OBSERVATIONS on the Fever which prevailed in the City of New-York in 1741 and 2, written in 1743, by the late Hon. CADWALLADER COLDEN. Communicated to Dr. DAVID HOSACK by C. D. COLDEN, Esq.**

SIR,

ACCORDING to my promise in our conversation upon the late sickness in New-York, I now send you an abstract of the piece I then shewed you, with my thoughts

* The present essay, on the fever of 1741 and 2, is printed from a copy corrected and enlarged by the author himself, and has been very lately found in a manuscript volume of his papers. Thus improved, it will doubtless be read with great interest by the philosophical as well as medical reader.

on the sickness, and how I conceive it may be prevented for the future. I shall be glad if it prove of any use, and

Am, Sir,

Your humble Servt.

No man who has any share of humanity or regard for the welfare of the society wherein he lives, can with indifference observe or hear of the mortality which has prevailed among the inhabitants of the city of New-York these two last summers, but will be desirous to give what assistance to his neighbours he can, by any information which has come to his knowledge, or by any other means in his power. When any disease yearly returns in a particular place, while the country around remains free from it, people naturally conclude, that it is owing to something peculiar to that place, and in order to discover whether any thing peculiar to the soil or air of New-York may reasonably be supposed to be the cause of these epidemical fevers, I shall make an abstract from a book which I have by me on the subject of malignant and pestilential fevers, occasioned by a faulty air or soil in particular places, wrote by Lancisi, physician to Pope Clement XI. a man of great character both as to his skill in physic and his probity, who treats of this subject more fully and clearly than any author I have seen. I expect this may be the more acceptable because it is a rare book and perhaps not another copy of it in this part of the world besides that which I have.

I think there is the more reason for admonishing the inhabitants of New-York on this, because, by their being originally from the northern climates, where the ill effects of stagnating waters are not so remarkable as in the warm

climates, they may be more negligent in this point, and less apprehensive of the danger that arises from thence. These fevers recur yearly in the summer from the time the weather begins to grow hot to the end of September : they commonly cease during the winter colds : they are milder at their first appearance, but grow more and more malignant as the season advances ; they are at first commonly of the intermittent kind, but more frequently (especially as the hot weather advances) the paroxysms only remit, and at the same time many have continued fevers, with frequent exacerbations rather than remissions : the sick contract a dead, dusky, yellow complexion, and before they die purple eruptions frequently happen on the skin : the intestines are almost always affected, and have been found generally sphacelated in the bodies which have been opened ; the brain is likewise often affected and all the worst symptoms of fevers generally attend these before death, though sometimes the fever appears so mild, that the sick is not thought in danger till apoplectic or comatose symptoms appear, which declare him past recovery : they have seldom any regular crisis, but the sick, when they recover, continue long weak and infirm, and they are often succeeded by chronical distempers.

These are the general characters of these fevers, collected from several parts of this book. Lancisi at first gives a more general account of these fevers, from the ancient Roman historians, and first he observes, that the place whereon Rome was built was, in its natural state, unhealthy, and for that reason avoided by the first inhabitants of the country ; that this unhealthiness was occasioned by swamps and stagnating waters between the hills on

which the city was afterwards built, as appears from Ovid 6. Fastorum.

“ Hic ubi nunc fora sunt, udæ, tenuere paludes :
Amne redundatis fossa madebat aquis.
Curtius ille lacus, siccas qui sustinet aras
Nunc solida est tellus, sed lacus ante fuit.
Qua Valebra solent in circum ducere pompas
Nil præter, solices, cassaque canna fuit.”

As the first inhabitants of Rome suffered much from these stagnating waters, their kings bestowed a great part of their care in draining these low grounds, and it is taken notice of by historians, as a memorable act of Tarquinius Priscus, that he drained Velabrum by a very notable canal. Pliny takes notice, as one of the greater works of M. Agrippa, that he cut through mountains in order to bring seven rivers into the city, to wash and cleanse the canals and sewers of all filth, and that he had in a manner undermined the whole city, in order to keep it clean and healthy. The Roman historians observe, that as often as these drains were neglected and stopped, so that the water and filth stagnated, the city became unhealthy, and the inhabitants were wasted by malignant and pestilential fevers. When this happened the Romans spared no cost to cleanse and keep the city clean. C. Aquilius writes, that the common sewers being by neglect stopped the censors bestowed a thousand talents in opening and cleansing of them. In order to keep the city always clean, the Romans chose magistrates, called ædiles, and curatores for that purpose, who had under them several companies of men continually employed in that work : they wore a particular badge to distinguish them, and, for their encouragement, enjoyed special privileges, and were freed from all other public services.

The Romans, likewise, under severe penalties, forbade diverting of the money to any other use, under pretence of any necessity however urgent, and by special laws, laid heavy penalties on those, who by negligence suffered the water or filth any where to stagnate and remain. Such was the care of this wise and prudent people ; and certain it is, that without taking such care of the health of the inhabitants, they never could have rose to that grandeur they did : and the effect of this care is very manifest, when so great a city, crowded with such vast numbers of people, during all the time of its grandeur remained exceedingly healthy ; though, as has been observed, by the nature of its soil, it was most likely to be otherwise. But after all these great works, for keeping the city clean, were destroyed by the incursions of the Goths and Vandals, Rome became exceedingly unhealthy, as appears by the following verses of Damiani, wrote in the eleventh century.

Roma vorax hominum domat ardua colla virorum ;
Roma ferax febrium, nicis est uberrima frugum ;
Romanæ febres stabili sunt jure fideles,
Quem semel invadunt vix a vivente recedunt."

And Pope Innocent the 3d writes, in the 12th and 13th centuries, that few in Rome reached forty years of age, and scarce any sixty.

Lancisi observes, that many of the places where the ancient Roman senators had their country-seats, are now infamous for their unhealthiness, which could not have been so in their time, considering their delicacy in their choice of every thing for their pleasure ; but that this unhealthiness of those places has happened since, by the neg-

ligence of the present owners in suffering waters to stagnate there. Aquileia, once a flourishing city, the metropolis of the country and the seat of a patriarch, is now reduced to a pitiful country town, by the negligence of the inhabitants, without any calamity of war, or misfortunes from abroad, but merely by their suffering it to grow unhealthy by stagnating waters in moist slimy ground. Dr. Rosinus Lentilius, the Duke of Wurtemburgh's chief physician, observes, that there having been formerly a large swamp in the neighbourhood of Stuttgart, the capital of the country, that city was yearly subject to malignant fevers; but, that swamp being drained, and converted into meadow grounds, the city afterwards became healthy. So likewise Rome, in the 16th century, was in a great measure restored to its former state of health, by the care of the pope who reigned at that time, who caused all the stagnating waters to be drained off, and took care that the city was every where kept clean. But one particular place where the inhabitants were obliged to carry and throw the dead carcases of beasts and other filth into the river, was frequently subject to the return of these annual malignant fevers, by the inhabitants not taking sufficient care to throw their filth far enough into the stream, whereby such nastiness remained upon the shores, or kept floating in the eddies, and occasioned an offensive smell there.

The river Morano, in 1608, having by a flood overflowed its banks, filled the adjacent lower parts of the city of Rome with stagnating waters, which remaining there corrupted, and sent forth stinking vapours, whereby the adjoining houses were infected and became unpeopled by the death and flight of the inhabitants. Pope

Clement the 8th ordered a large drain to be cut, by which that part of the town was kept dry, and it continued afterwards always as healthy as the other parts of the city.

In 1695, that part of the city of Rome called the Leonine, became offensive to the inhabitants by a stinking smell: the inhabitants of that quarter were seized with epidemical fevers, as likewise the adjoining parts to the northward of it, while the parts immediately to the southward, and the more distant parts remained free: this was found to be owing to a neglect in scouring the ditch of the castle into which that part of the town was drained: by cleaning out the ditch and opening the drains, that part recovered its usual healthiness. Our author likewise takes notice that the owners of a particular part of the town where there were ruins of some old great buildings, having dug deep into these ruins for materials for building, and suffering the waters to stagnate in the pits, it began to stink, and the inhabitants of the neighbourhood were seized with malignant fevers which continued till these pits were filled up, after which they entirely ceased.

The Tiber having overflowed its banks the 23d of September, 1704, Lancisi, chief physician to the reigning Pope, Clement XI. signified to the pope the danger that the health of the inhabitants would be in from the stagnating waters if they were not removed before the summer's approach. He set forth that the turbid water being carried into the lower parts of the town, fills the cellars of the houses and the wells, the waters of which chiefly serve the common people for drink; these waters, as

they are strained off the earth leave behind them all the filth with which they were impregnated from the dead bodies of insects, and the carcasses of dead beasts, &c. : that this slime during winter remains fixed, and sends forth no vapours, but after the summer heats begin, it ferments, and sends forth noxious vapours, exceedingly prejudicial to all the vital parts of the human body, and productive of fevers of the worst sort. He adds, that noxious vapours are not only thus produced at Rome, but in every other warm climate, except where they have frequent gusts of northerly winds during the summer which disperse those vapours which otherwise would hover and remain in the circumambient air where they are generated. He puts the pope in mind, that not long before a great destruction had happened among the inhabitants by camp or pestilential fevers, and that by the neglect of the governors of the city on an occasion like this, the prudent pope, pursuant to his physician's advice, issued an edict for draining the waters, and cleaning the city from all the slime and filth, and for keeping it clean and dry for the future ; and care being taken to have this edict effectually put in execution, the city had remained to the time Lancisi wrote his book, the space of fifteen years, entirely free from all fevers of that kind. Pisaro is situated at the mouth of a river, near the Adriatic sea, in a plain near great quantities of marsh and oozy grounds, and was infamous in ancient times for the unhealthiness of the place, as appears from the following distich of Catullus.

Præterquam iste tuus moribunda a sede Pisauri
Hospes, inaurata pallidior statua.

It continued so for many ages ; so that scarce any of the inhabitants ever reached fifty years of age, until it had

the good fortune to fall under the government of a wise prince, who, in order to relieve the inhabitants from the mischievous effects of the situation of this place, opened the channel of the river, cut its course more straight, made large canals for draining off the water from the low places, and where they could not be drained filled them up. This was done in the years 1515, 1517, 1518, and from that time the city became healthy, populous and opulent, until the citizens, forgetting from what causes they enjoyed such blessings, suffered the canal of the river to fill up, and neglected their drains, and this occasioned in the years 1708 and 9, grievous malignant fevers. An engineer was sent by Lancisi's advice to Pisaro, to contrive proper methods for draining the country, which being effected, the city was restored to its former state of health. In 1705, malignant pestilential fevers became yearly epidemical in Urbevetano, a town formerly very healthy; this Lancisi said was occasioned by the inhabitants digging many pits in their low lands near the town for rotting flax and hemp, at the same time neglecting these drains, and suffering their streets to become offensive to the smell by the filth that remained upon them. By Lancisi's advice, the pope ordered these pits near the town to be filled up, and others made at a greater distance from the town. That the drains, cisterns, and cellars of the town, and the pits for rotting the flax and the hemp should be yearly cleaned in the months of January and February, that the slaughter-houses be removed out of the city, and set in such places where the filth exhaled be constantly washed away by every rain. These orders being effectually put in execution, the fever did not return the following summer; and the town kept free of them to the time Lancisi wrote in 1716. The citizens erected

an inscription on one of their gates, in commemoration of their deliverance from these pestilential fevers, and of the means by which it was procured.

On the first of May, 1707, the hilly grounds to the southward of the town of Bagnarea, after continued great rains, began to fall into the river which was near that town in such a manner that whole vineyards were moved from their places, and some houses entirely, without falling: in one of them a woman was delivered of a child, while the house was on its march. The channel of the river was choaked and filled up. Many cracks, gaps, and holes were left in several parts of the ground, in which the waters stagnated, and they being impregnated with sulphureous minerals, with which the earth there abounded, they became exceedingly offensive to the smell. In the summer heats, the colour of the inhabitants became of a dead swarthy yellow, and grievous pestilential fevers seized them. These were confined to the southern and lower parts of the town, while the other parts which stood high and at a distance from the stagnating waters, out of reach from the vapour which arose from thence, remained healthy, as usual. The channel of the river, by order of the magistrates, being cleared, drains made for carrying off the water, the places where it stagnated cleared, and the cavities, which could not be drained filled up, the inhabitants were the next summer freed from them till the time Lancisi wrote, and he doubts not that they will continue so as long as they shall continue to keep the town and adjacent parts clean and free from stagnating water.

In the public thanksgiving, ordered for this deliverance, the bishop declared the obligations they were

under to Lancisi, by whose advice they had been delivered from such pernicious diseases.

Our author, in like manner, observes, that Ferentino, by his advice was delivered from such like epidemical distempers, in which I find nothing particular to be taken notice of, but that the necessary works for draining the stagnating waters and keeping the town clean were obstructed for some time, by the avaricious penury of some of the inhabitants, and the private interest of others, which in such cases must sometimes unavoidably suffer. Lancisi was so much confirmed by long experience in his opinion, that these kinds of fevers are always occasioned by stagnating waters, that whenever he heard of such fevers breaking out in any place he did not doubt to affirm, that they were occasioned by filthy offensive water, a slime stagnating in those parts, and that before he had information of such cause, and frequently before the inhabitants themselves had taken notice of the cause. This, his conjecture, was always confirmed upon a proper inquiry. I shall only add that Ramazzini likewise observes, that in 1690, the inhabitants of the low moist parts of Modena were seized with epidemical fevers, while those of the high parts of the city remained healthy. All the writers in physic confirm the truth of these observations whenever they have occasion to write on this subject, and indeed stagnating waters have been infamous from all antiquity for their noxious quality, and for that reason by the ancient poets described under the representation of the hydra, throwing out a poisonous deadly breath. Clear, deep ponds, are not found unhealthy, though they have little or no motion. Nor are salt water ponds ; but the more saturated they are with mud and slime, especially with the

dead carcasses of insects or of beasts, or other nastiness, or of sulphureous or arsenical minerals, the more mischievous they are ; and the greater variety in the mixture, they are thought to be thereby the more noxious. Salt water, when it is mixed with fresh water, thus saturated, is more mischievous than fresh ; hence the marshes, where the salt and fresh waters meet, are more unhealthy than either the salt marshes or the fresh water marshes. Places situated on the north side of those slimy wet places, are more unhealthy than those on the south side of them, because the warm moist southerly winds increase the fermentation, and consequently the quantity of noxious vapours rising from it, and carries them to the northward. Stagnating waters are not so hurtful to those that have been accustomed to such an air, as to those that come from a clear, healthy air. It is more dangerous to sleep in such an air, than to use exercise in the same air, for it is observed, that the vessels of any animal imbibe more of the moisture of the atmosphere, while they sleep, than when awake.

The ill effects of noxious vapours increase with the heat, and frequently grow pestilential about autumn : the reason of this is, that in the beginning of summer, the vapours are diluted and mixed with a greater quantity of water (which blunts the force of the noxious particles) than in the autumn, when the purer parts of the water are all spent and carried off. Stagnating waters are never noxious in the winter, because the winter colds stop all fermentation, consequently the emission of noxious vapours. The ill effects of noxious vapours are different in different constitutions of the air, and in different climates, for all fermentations are altered by the different state of the atmosphere, and this is the reason why the same kind of

spirit cannot be produced from molasses in North America, that is produced from it in the West-Indies ; and of the different kind of spirit produced in the several islands ; the different state of the atmosphere, is the reason of the different effects that the noxious vapours from stagnating filthy water have on the animal œconomy ; because, not only different kinds of vapours are raised, from a different fermentation in the stagnating fluids, but they raise likewise different fermentations in the animal fluids ; hence different kinds of fevers produced in different constitutions of the air, and, for the same reason, physicians are never certain of the method of cure, till by different and repeated experiments they discover what is prejudicial or helpful ; for the different state of the atmosphere is not to be discovered by the organs of our senses. For this reason likewise, the safest prescription a physician can make to his friend is, the *pilula ex tribus*, as it is commonly expressed, viz. cito, longe tarde, ac cede cito : longinquus abi, serusque revertē.

These two last years (so far as I can recollect from my memory, for I have not made any particular observations) we have had fewer thunder-gusts than usual, though sometimes a few sharp ones in particular places, and fewer north-west winds succeeding these thunder-gusts. Now, thunder-gusts disperse these vapours, and are observed likewise to obstruct fermentation, as appears by their effects on fermenting liquors—beer, wine, and cider, while new and fermenting, and upon eggs while hatching. If this be confirmed by the observations of others, it may give a reason why those noxious vapours may have produced more direful effects these two last summers than usual. I shall next take notice of some things which one not very nice in observing may have taken notice of in America, in confirmation of Lancisi's observations. First,

it is generally taken notice of all over North America, that where the salts and freshets meet, if it be in marshy, oozy grounds, those places are most subject to intermittent fevers, and sometimes to a fever of a malignant nature. I remember that several years since, when I was at Bristol in Pennsylvania, opposite to Burlington, which is situated to the northward of a large space of swamp ground, they told me that they had been from the first settling of Bristol subject to intermittent fevers, of a malignant kind, and indeed, the aspect of the inhabitants shewed the ill effects of the air which they breathed. While I saw them they assured me, at the same time, that not above two or three children, born in that village, since its first settling, had attained to the age of maturity; but, since that time, these swamps having been drained and converted into profitable meadow grounds, I am informed that Bristol is in a great measure freed from these annual epidemical fevers.

It is well known, that the Paltz-river, or Wallkill, in Ulster county, in this province, has been long taken notice of as very prejudicial to the health of those who live near the banks of it. The waters of this river are of a dark colour, and come from a large space of ground overflowed with stagnating waters. The inhabitants along this river, are yearly afflicted with intermittent fevers, during the summer season, and a constant fog or vapour is observed almost all the summer (except in the time while the north-west or northerly winds blow) to arise over that river, and to remain there at a certain height and distance every morning, till the heat of the sun disperses it, and frequently likewise in the evening.

I have observed these intermittents to have different

degrees of malignity in different years, and that these two last years they have been more malignant than usual. There may be a reason given for this malignity this last summer ; besides that of the fewer thunder-gusts which were common with the year before, viz. the great number of ground caterpillars, which destroyed the grass in the meadows, from whence this river and the streams which run into it arise, and which died there, and raised a very offensive smell. I have known some of the inhabitants along this river, who by removing their habitations to a small distance from the river, to a higher ground, and to the south side of the river, have freed their families from the influence of these noxious vapours ; but that a removal on the north side had not been so effectual in preventing these ill effects, though it was to a high ground. I shall in the last place, endeavour to apply some of the preceding observations to New-York in particular.

1st. It is well known that part of the town chiefly afflicted with the epidemical distemper these two last summers, is built upon a swamp or moist slimy ground ; that it is flat and the waters not easily drained from thence ; that some other parts of the town are likewise built on low swampy grounds, and that the moisture of these grounds is to be observed in every cellar of the houses built on them. 2dly. No person that walks along the docks, but is sensible of the filthy smell there, especially in the slips ; that by an intolerable carelessness, the nastiness of the town is thrown into these slips, at such a distance from the stream of the river, that it is not carried off, but remains there, and is observed to ferment to such a degree, that it appears as if it was boiling to the eye of the spectators. 3dly. That there is no constant and suffi-

cient care of the drains by which the cellars are freed from stagnating waters, and that the cellars themselves are seldom or ever cleaned after the settling of corrupted slime. 4thly. That these parts of the town have always been subject to epidemical disorders, every summer towards autumn, especially among children, and that there is yearly a mortality among infants, and disorders more frequent at that time than usual in healthy places. I know that the fruit of that season is generally blamed as the cause of disorders among children; but if it be considered that the children of the country eat more plentifully of all kinds of fruit, and yet remain free from those disorders, and that keeping the children in the city entirely free from fruit does not save them from the epidemical distempers of the town, they must be attributed to some other cause; and, from the above observations, what more likely to be the cause than a faulty atmosphere of the place?

What has been before observed, naturally leads us to the preventive remedies of the annual epidemical diseases of New-York; that is, faithfully to drain out the slimy wet grounds, to fill up the slips, to take care that all the filth and nastiness of the town be emptied into the stream of the river: for which purposes, it will be necessary for the magistrates to think of effectual regulations, and to put them diligently into execution. I am of opinion this cannot be done effectually, but by the drains being put entirely into the hands of the corporation, for as they are now in the hands of private persons, managed only by a voluntary subscription, and dependent on the humours and inclinations of a great number of persons, many of them penurious, negligent, and insensible of the prejudices which follow on the drains not being kept in good order, and as the work cannot be carried on but by a general consent,

it must often fail, as is but too well confirmed by experience ; whereas, if these drains were managed by a public tax, then every one, as it would cost him no more, would be desirous of having his cellar clean and dry, and his nostrils freed from an offensive smell. But even in this case, to make this work be carried on effectually, the care of the drains must be put under the direction of men of known industry and zeal for the welfare of the town, and to bind those who have the direction more effectually to their duty, it should be so ordered, that every man may have an action for any damage he shall suffer by the neglect of the drains. If the magistrate should think the aid of the legislature necessary, more effectually to enable them to perform their duty, in this case it cannot be doubted but that they will easily obtain it, on a proper information and application.

It will be objected probably, that the late distemper in New-York has been imported, by infection from abroad. Suppose it be, yet this does not make it less necessary to drain the wet and moist grounds in and about the city, and to keep it clean and sweet ; for it is well known that some airs and constitutions of the atmosphere, are much more proper to feed and propagate infection than others ; that an air filled with corruption is a fit nourishment for infection ; for it is observed often to proceed from thence, as has been many times observed in camps, towns besieged, prisons, and in ships crowded with people, where sufficient care has not been taken to keep them clean. The different state of health was very remarkable in the city of London, before the *fire*, when the streets were narrow. ill paved, and few drains. Since that time, the streets are straight, open and airy, and many drains, and the streets are carefully

kept clean ; but especially by the advantages of the new river, which since that time has been brought into the city, by which all the filth and nastiness of the town is washed away.

In the year 1590, 25,886 died, of which number 11,503 of the plague.
1603, 37,294 died, of which number 30,561 of the plague.
1625, 51,758 died, of which number 35,403 of the plague.
1630, 10,595 died, of which number 1,317 of the plague.
1636, 23,359 died, of which number 10,400 of the plague.
1665, a greater number died of the plague than any time before.

By which it appears that the plague was in London once in twelve years, one time with another, before the fire of London ; whereas, since the fire, it has not been there in seventy-seven years.

Indeed, the supposition of the infection being brought from abroad, makes the reasons for cleansing the city and keeping it clean, more strong, rather than weakens them. It is well known that these infections are like a leaven, which will lie dead in cold weather ; but as soon as the weather becomes hot, they ferment anew, and propagate and spread wherever they can find a proper subject to work upon, which, it is allowed by all, is filthy corruption mixed with moisture. It is likewise observed, that some constitutions of the air or atmosphere are much more proper for propagating pestilential infection than others, as may have been particularly observed of the small-pox ; that sometimes it has been imported into places, where only one or two or a very few, have been taken with it, after which it has ceased without any particular care of the inhabitants to avoid it, but from the atmosphere being void of these vapours which are proper and perhaps necessary to feed it.

The plague has not been less frequent in several places with which London entertains commerce, since the year 1665, than before ; on the contrary, the commerce of the city of London has been much increased since that time, and for that reason, it can hardly be doubted, but that infection has been several times imported since the year 1665, and there are some instances of its having actually appeared in some parts of London ; but the atmosphere of London being less proper to propagate the infection, it has been much more easily stifled by the inhabitants. But besides this of taking away the proper nourishment of the pestilential leaven, it will be necessary to destroy the leaven itself, and as this most probably is preserved in the filth of the town, so it is likewise observed to be often retained in clothes, especially woolen clothes, which keep it warm and defend it from the severity of our winters, when the cold otherwise would destroy it. It may be necessary, for this reason, that, by public authority, every house and corner of the house be cleaned out, and under severe penalties when neglected, and all the clothes and apparel be exposed to the open air, in the coldest season of the year, and that for several days together. It is very difficult for the magistrates to take that care to have this effectually done in every house and corner ; some people are so wretchedly stupid, that rather than take some trouble for a few days, they will risk their own health and even the destruction of the whole community. It is for this reason, that many wise legislators instituted religious fasts and purifications towards the end of winter, in order to engage the more thoughtless people to the performance of so necessary a duty, by enforcing it on their consciences as a religious duty, commanded by the immediate edict of the deity.

There is no doubt, that it is a duty incumbent on us by all laws, human and divine ; and whenever the magistrates shall enjoin this work, it will be the duty of christian ministers to inculcate the punctual performance of it on their hearers, that men's consciences may be awakened by the heinousness of the sin, as the neglect of so necessary a duty certainly is the nourishment of this destructive leaven. In the last place, it is necessary to observe, that the summer is no proper season for cleansing the city from corrupting filth, for the stirring it at that time increases the quantity of vapours, and the doing it at that time has been observed to produce the most direful havoc among the inhabitants. The most proper season is, toward the end of winter, when the fermentation is entirely destroyed, and the doing it at that season will have another advantage, that less filth collected in the winter will remain on the approach of summer.

P. S. I forgot to mention a remarkable confirmation, in sight of the town, of what has been advanced in the preceding treatise. A fresh water pond and meadow of stagnating water, not half a mile to the northward of the city of New-York, has been lately drained for the benefit of the soil, without any thought of any advantage to the health of the neighbouring inhabitants, though its effects in that respect be very manifest. Every summer the inhabitants of the houses on the north side of it, before it was drained, were subject to malignant intermittents, and several, in the few houses there, yearly died. Since the draining of that place, these houses are become as healthy as any in the neighbourhood. Caspar Cantarini, in his account of the republic of Venice, mentions a new college, or council of magistrates, appointed not long before his time,

to take care of the health of that city, and whose business, among other things, was to cause all filth and every nuisance to be removed, and the city kept clean. He observes that, before this institution, Venice had been frequently subject to pestilential distempers, insomuch, that many of the inhabitants for that reason had deserted their houses, and removed their families to the continent, but, that after these magistrates were appointed, who continued vigilant in their duty, the city had always remained free from any grievous pestilential distempers, though there had been several instances of such like distempers breaking out from time to time in private houses and quarters, which, by the care of this magistracy, had been always kept from spreading or becoming epidemical.

IV.

OBSERVATIONS *on the FALLS of the OHIO*, by Col. JONATHAN WILLIAMS, *President of the United States' Military Philosophical Society, Fellow of the American Philosophical Society, &c. &c.**

(Read October 5th, 1806.)

To the Chairman of the United States' Military Philosophical Society.

West-Point, October 4th, 1806.

SIR,

I HAVE more than once heard it observed, that it is the duty of every man, to make the natural history of his

* In conformity to a vote of the United States' Military Philosophical Society, the Editors have been favoured with a copy of the following valuable communications (the 4th and 5th articles) made to that body, by their learned President.

EDITORS.

own country as much known as possible, and, if his knowledge were but a mite, he is bound to throw it into the common stock ; thereby to improve and extend the benefits which Providence has bestowed on this favoured part of the world.

Impressed with this sentiment, I am induced to send you my mite, which if it cannot rise to the title of a benefit, may at least gratify curiosity.

The river Ohio, which, on account of its peculiar beauty, was emphatically called "*La Belle Rivière*," by the French, has but one bed of rocks, that runs across it, throughout its whole course, from Pittsburg to the Mississippi. This obstruction is at Louisville, and, although the rapids occasioned by it, are called Falls, they are not such, as absolutely prevent navigation : but they are sufficient to render it both difficult and dangerous. My examination of these falls, being incidental to my passage down the river, and confined within the limits of a traveller's time, a full and minute description cannot be expected ; but, in order to convey, as accurately as possible, all that was discovered, I shall adopt the style of narrative, and mention every circumstance.

In the month of August, 1801, I descended the Ohio, with troops and stores under my command, in large boats, and arrived at Louisville, when the waters were at the lowest, and but one of the shoots,* as they are called, could be navigated.

* Probably a corruption of the French, *chute*, or fall.

Mr. Nelson, of Louisville, who was engaged to pilot the boats through, observed to me, in the course of conversation, that there were a great many curious petrifications on the rocks in these Falls, particularly of the excrements of geese, and of buffaloes' horns. This account appeared to me fabulous, for it was inconceivable that light substances could be retained an instant, in a rapid current, far less was it possible to believe, that they could become petrified in that spot alone, and not in other parts, where the water, being in a more quiet state, is better able to exercise its petrifying quality on substances at rest in it.

The next day, I went with Mr. Nelson to the edge of the farthest shoot, passing over two, one of which was almost dry, and the other about knee deep. The whole space, between the second and third shoot, was strewn with these appearances, which much resembled what they were supposed to be, as to external form, but various in size. On breaking one of them, there appeared to be a regular arrangement of longitudinal fibres; and, upon my remarking to Mr. Nelson, that although this might be the case in a horn, it was absolutely impossible in excrementitious matter, he noticed its resemblance to a root, and it instantly occurred to me, that if these appearances had been roots, I should, by tracing their origin from the smaller towards the larger ends, as they appeared here and there above the surface, arrive at the tree from which they issued: the search soon brought me to the complete form of a stump, apparently cut off horizontally, and I could trace its annulars and radii, as accurately as I could have done in a sawed log of wood. The surface was as smooth as a hone, and so hard that I could not break off any part with an axe, but fairly beat the head of it into a

shapeless mass, by repeated blows. The utmost I could obtain was a few small pieces, where they happened to be detached and project a little from the mass, which appeared to be one bed of petrification.

On a farther examination, I found many more trees, and could distinguish various kinds ; some were of a fine red colour in the centre, diminishing to white at the circumference, and plainly appeared to have been red cedar : others were very compact, and of a light straw colour, like the beech : others of a darker colour, more separated fibres, and more distant annulars, like the oak ; some we found in an inclined posture, so that the section being oblique, made the annulars appear elliptical ; others were nearly horizontal, like fallen trees, and displayed the appearance of a well planed board, somewhat across the grain. Upon further examination, it appeared evident to us, that the whole mass of rock had been a forest of large trees, and the surface we saw, might be easily conceived, by imagining a number of trees to be very smoothly cut level with the hard ground, and every species of vegetation to be swept away, while the superficial roots protrude about half of their diameter, in many places, and then dip under ground again. Our parade at the cantonment, near the mouth of the Ohio, having been made out of a forest, exhibited precisely the same appearance, except the distinction of wood and earth in one, and a petrified mass in the other. Whoever will give themselves the trouble of examining the superficial and repent roots of our lombardy poplars, will see, in part, an exemplification of what I mean to describe.

After establishing these facts, the next thing should be,

to draw some useful conclusion from them ; and one that occurs to me, is the probability it gives of the facility of making a locked canal, to unite the waters above and below the falls, thereby rendering the navigation more convenient ; for it often happens, that a loaded vessel, ready for sea, arrives at the falls too late to pass them, by which the owner is reduced to the alternative of waiting several months for the waters to rise, or of transporting, at a heavy expense, the whole cargo, three or four miles by land, to say nothing of the advantage of giving passage to loaded boats, ascending as well as descending, without any delay. That it would be easy to make a canal is probable, because there seems to be no reasonable apprehension of meeting with rocks in the way, which would have been very probable, if the mass of obstructions had been original rocks ; and as the whole country, above these falls, to an extent of fifteen hundred miles, is interested in facilitating this passage for its produce, the time may not be far distant, when such a measure will be adopted.

It may appear singular that this discovery was not made before, and that nothing has been said of it by others, since I made it : the reason is plain : a man must be at the spot, in just that time of the year, when the waters being at the lowest, there are very few river navigators. This man must be affected with that agreeable mania, of seeking something new, wherever he goes, and he must be enough of an enthusiast, not to consider his labours a trouble. I do not know, that a single inhabitant of Louisville, ever went so far over the falls as I did, and, even Mr. Nelson, who follows the business of a pilot, was never so far before. Indeed, it is a trite observation, that the very circumstance of having it in one's power, to do a

thing at any time, is the cause of its being perpetually neglected. I should feel myself liable to this reproach, if I had not made a communication of these facts to the American Philosophical Society, at Philadelphia, and deposited in their museum the specimens above mentioned.

The result of these facts and circumstances, seems to be an indication at least, that the river Ohio had formerly another bed, or that this part of its bed has been much widened. Were I to hazard an opinion, I should favour the latter supposition, for it seems to be a natural event, from self-evident causes. Let us suppose a quantity of drift trees, which floods and storms are almost constantly sending down our large rivers, to accumulate in some narrow part, and there form an obstacle to the passage of the water : this passage, once obstructed, in a small degree, would become more and more so as more drift wood came down : the limbs and tops of the trees would be torn off, and float with the current, but the trunk, roots, and masses of earth around them, would remain, and the lower parts, being the heaviest, would preserve generally a vertical position. As the water became damed up, it would spread and find new passages, on either side, overwhelming the adjacent borders, and, in the course of time, the petrifying quality of the water, would change the whole mass into calcareous earth and apparent stone, preserving the form of the original substances. The great width of the Ohio, in this place, the number of channels it has formed, the irregular windings of these channels, and the number of small islands in its course, to a considerable distance, seem to justify this opinion. I do not presume to assert any thing, and shall be glad to be informed, by more experienced naturalists, who might, by analogy, point out

more probable causes for these appearances. In the mean time, as hydraulics make a very important branch of military science, the subject may not be thought unworthy of the consideration of this society.

JON. WILLIAMS.

V.

On the height of the MOUNTAINS in Virginia and New-York, with observations on the formation of RIVERS, by Col. JONATHAN WILLIAMS, President of the United States' Military Philosophical Society, Fellow of the American Philosophical Society, &c.

(Read Nov. 5th, 1810.)

IN the summer of 1791, having occasion to travel from Richmond, to the back parts of Virginia, I observed the barometrical changes, as I ascended the blue ridge, descended on its western side, and again ascended the Alleghany mountains; these changes being reduced by the rule of calculating heights barometrically, gave a set of results which were afterwards communicated to the American Philosophical Society at Philadelphia, and published in the fourth volume of its transactions. But as these results were in a small degree erroneous, owing to the omission of a due allowance for the expansion of the mercury by heat,* I now subjoin a more accurate account of the height of the most prominent points from the level of tide water. To these, I have added the heights of the Highlands, in the neighbourhood of West Point, which have

* The thermometer stood at 80, on the Alleghany Mountains.

been lately very carefully examined by Captain Alden Partridge of the corps of engineers, and professor of mathematics in the military academy. He had the advantage of having one barometer below, while the other was above, and by means of assistants, both observations were made at the same time. As I travelled with my single instrument, and as a long lapse of time intervened between the comparison of the height of the mercury, below and above, the same accuracy was not possible.

The following is a statement of all the results.

Altitude in feet above the level of tide water in Virginia.

1. The highest point of the blue ridge, near Rock fish Gap 1908
2. The foot of the blue ridge on the western side 895
3. The summit of the first mountain, near the warm springs 2018
4. The summit of the second mountain, near the warm springs 2380
5. The summit of the Alleghany Ridge, about six miles west of the Sweet Springs 2988

Altitudes taken by Captain A. Partridge, near West Point, state of New-York, above tide water, also in feet.

1. The Plain at West Point 176
2. Fort Putnam 561
3. Crows nest, on the west side of the river 1330
4. Butter Hill 1432
5. Old Beacon on the east side of the river 1379

6. Bull Hill	1391
7. New Beacon	1486

It will be observed, that the Blue ridge of mountains do not descend on the west side so far as they ascend on the east, the country behind them being generally from 800 to 1000 feet higher than the foot on the east side, while the Highlands on the north river descend again to the level of tide water. This seems peculiar to these highlands, which form, as it were, an insulated ridge, while the great back bone of our country rises by stages to its highest point, and then descends by stages again to the western waters.

In like manner, the Andes, some of which rise to twenty thousand feet above the ocean, have valleys from two to six thousand feet deep, between them, but they altogether form one mass. It is indeed peculiar to Hudson's river to have highlands near the mouth of it. Most of the rivers in the world have low lands to a very great extent, and the larger ones terminate in several branches towards the sea.

In our country, the Delaware, and every river south of it, runs through a comparatively low country, while in Europe, Asia, and Africa, the remark also holds good ; the exceptions to it will, (if any) be probably found in the more northern latitudes ; but I know of no river that in this respect can be compared with the one on which we live, either in its highlands, depth, extent of tide water, or the excellent harbour at the mouth of it.

The precipices on the North river which have their

fronts towards the east southwards, and south, westwards, are in many places perpendicular to the horizon, as the pallisado rocks between New-York and Tappan Bay and in all are very rugged and steep, while all the land that fronts towards the west, northwards, and north, eastwards, presents to our view a gradual slope : this is evident, on the right hand ascending the river, where the beautiful grounds of York Island, of the vicinity of Philip's Town, Tarritown, Mount Pleasant and Peekskill, form a series of contrasts to the opposite side, and after passing the highlands we see the northern side of Butter Hill on the west, and of Beacon Mount on the east, descending in a gradual and beautiful declivity. The only exceptions to this rule are in the narrow passages which are evident eruptions made by the water forcing its way through them, for if we reason by analogy, and from small effects to great ones, we shall be led to the conclusion that the large bays in the North river were formerly lakes, connected by falls, which have by time so worn away the obstructions as to form the narrow passages we now find, with the rude vestiges of the rupture on both sides.

Ponds of a great extent still remain imprisoned in various parts of the highlands, and as their capacity and depth bear no proportion to the resistance around them, they will probably remain ponds for ever : but it might not, to a reflecting mind, be a very great stretch of the imagination to suppose that a time may come, when even the Falls of Niagara will be worn down level with the bottom of Lake Erie, which would discover vast tracts now submerged, and should the rupture be sudden, probably make great changes in the face of the country below it.*

* Commodore Grant, one of the oldest and most respectable inhabitants in Upper Canada told me in 1801, when I was in that country,

But to return to the varied and opposite appearance along the banks of the Hudson: it is always pleasing to detect nature in her stupendous operations, and to discover the remote causes of what at first view appears so wonderful. It is well known that ice occupies a larger bulk than water, and of course all fragile vessels full of water, burst on being frozen; hence we may conclude, that water filtering through the fissures of rocks, and contained in the small cavities, must burst these fissures and cavities, when, by being frozen, it must expand to a greater bulk than they can contain. Now, the oftener this alternate liquid and solid state of water takes place, the greater must be the destructive breaches made on the sides of mountains, so exposed to this cause and effect. With these preliminaries let us recur to what takes place on the sides of mountains, one fronting from S. E. to S. W. and the other from N. W. to N. E. during winter.

In the first case it is evident, that the frost of the night will be melted in the course of the day, as the apparent motion of the sun progresses through these points, and

that the Falls of Niagara had receded considerably since he first saw them; and it was evident, as far below the Falls as Queenstown, that the strata on both sides of the river were exactly similar, even springs and small cascades on one side, had corresponding ones on the other, as if they were the effect of rupture: but what seems to confirm the supposition more strongly is, that the ridge of country which appears to have formed the great barrier between the two lakes, is eight or nine miles in advance of the Falls. It is a well known proverbial saying, that constant dropping will wear a stone, and in all rapids we find holes worn into the rocks by whirlpools: if these effects of running water were to be extended to the immense mass that pours over the Falls of Niagara, the wearing away of the obstructions would appear not merely problematical but unquestionable.

the water, which in the day fills the fissures and cavities will be frozen in the course of the night, and thus the work of destruction will be continually going on during the frost, and the spring torrents washing all that was detached down to the foot wear away the surface and form vast gullies and precipices. In the second case, as soon as the frost has fastened all the northern side into one immoveable mass, it will so remain till the gradual thaw of the spring permits the water to escape over the frozen surface, all of which passes off superficially, and leaves the mass undisturbed except by what afterwards happens in the spring and summer rains. The observations applied to our highlands, will apply to all other mountains in the world, and accordingly we find it adopted as a general rule, in what is called by an eminent French writer* "*the Theory of Mountains*," that the southern sides are precipices, and the northern, gradual slopes.

Since the facility of transportation on this river has been so much increased, travellers from every part of the union have been drawn towards it, as well to enjoy its magnificent views, as the benefit of the salubrious springs towards its source, and it must have been a matter of general remark, that it affords a greater and more extensive shelter for a navy warlike or mercantile, than any nation in Europe can boast of. But there is one fatal objection to the permanence of this shelter, for during the season of the floating ice, no ship can ride in the North river: these advantages, therefore, which challenge the world for a parallel, are destroyed in a sudden frost, or an unexpected thaw. Let us now cast a view along the west shore, from where Fort Lee stood opposite to Manhattanville,

* Le Fabre.

to Tappan Bay. Here we see a high and perfect shelter from the north-west winds (the only ones to be dreaded in winter) extending to the length of ten miles, a depth of water close in shore sufficient for all vessels that navigate the North river, and, from three to five hundred yards distance, depth enough for any ship that can pass the bar at Sandy Hook ; and while the shores on New-York island have immense masses of ice crowding one against, and often one upon another, there remains a wide space, either of clear water or quiescent ice, along the west shore. All that is necessary to make this permanent is to secure it from the floating ice at certain times, though comparatively seldom, and this might be effected by piers, at a proper distance from each other, and at right angles with the shore, extending from three to five hundred feet into the river. Twenty of these piers one thousand feet apart would be a safe harbour for four hundred sail of large ships, and twice the number of river craft, in the very worst season, supposing them to be in tiers as deep as the space would allow, and these obstructions to the ice might be multiplied to as great an extent as could be required. To construct one of these piers, we must not make a comparison with the docks of New-York. One fifth, perhaps one tenth of the expense would be all that would be necessary ; for we have only to make stages on a proper slope, and the stones of the palissadoes may be made to go by their own gravity into their proper places by tons at a throw, and of themselves form the requisite obstruction to the ice, which need only be a mass of stones, without any other shape than such as they would naturally take.

This is not all ; the taking away of a mass of stone for

each pier, would open a passage into the country behind this inaccessible precipice, and thus bring to New-York market the produce of a vast extent of territory, which at present can be brought to the distant ferries only by an expensive land carriage. Thus, the whole expense, whatever it might be, would be paid for by the increased value of the soil, and these winter harbours be produced without (in a national point of view) any expense at all.*

The importance of this subject connected with that of the superb advantages of this harbour in general would draw me into an immoderate length; I must therefore conclude this essay with the ardent wish that I had the power to impress on the minds of the inhabitants of New-York an adequate idea of the commercial and maritime advantages they enjoy from nature, and inspire them with a steady resolution of embracing every means of art for their improvement.

JON. WILLIAMS.

P. S. Since the foregoing was communicated to the Society, the following letter and its annexed statement has been received.

* The facility and cheapness of making these piers by finding the stones on the spot, and merely throwing them into the water, is the reason for mentioning the Palisado rocks in particular, for if we were to go to the expense of a regular Mole, we might come nearer home. The bluff point of Hoboken, the seat of Col. Stevens, is in view from the city. Let our ship owners remark this place during the ensuing winter, and they will perceive what a fine winter harbour might be made by running a long pier from this point.

West-Point, October 30th, 1810.

SIR,

I HAVE the honor to enclose you the result of our expeditions to the Catskill mountains. The altitude of those mountains is rather greater than I expected to find it. I have attached such specific names to the principal peaks, as I found made use of by the inhabitants. The Round-top (as it is called) is said to be the highest peak in the range, and next is the one called the High-peak. The turnpike-road from Catskill town, toward the Delaware river, passes over a considerably elevated part of the range. There are two considerable ponds (or lakes as they are called by the inhabitants) on the top of the mountains, near where the turnpike passes, the outlet of one of which is precipitated over the falls, called the High-Falls, the altitude of which (according to our calculation) is herein enclosed. By the altitudes of the two mountains, the Round-top and High-peak, above their own bases, is meant their altitudes above that part of the range on which they are situated.

I am, sir, very respectfully,

Your obedient servant,

(Signed)

A. PARTRIDGE.

COL. J. WILLIAMS.

Barometrical calculations of the altitudes of the most elevated parts of the Catskill mountains above Hudson's river, and their bases, lying in the town of Windham, county of Green, state of New-York.

	Feet.
Altitude of the Round-top, above the river, .	3566
Altitude of the High-peak, above the same, .	3486 $\frac{1}{2}$
Altitude of the highest part of the Turnpike, above the same,	2273 $\frac{1}{4}$

Altitude of the Round-top, above the base of the range of mountains,	2911
Altitude of the High-peak, above the same, .	2831
Altitude of the highest part of the Turnpike, above the same,	1630
Altitude of the base of the mountains, above the river,	655
Altitude of the Round-top, above its own base,	1550
Altitude of the High-peak, above its own base,	1470
Whole altitude of the High falls,	310 $\frac{1}{2}$
Altitude of the first falls,	190
Altitude of the second falls,	120 $\frac{1}{2}$

(Signed) A. PARTRIDGE.

Captain Partridge was attended by several cadets from the military academy, and barometrical observations were made below, while he made those at the different heights in the above table; there can therefore be no doubt of his correctness.

Before I conclude this communication, I beg leave to make a remark, which appears to me, at least curious, if not otherwise of importance.

By the graduation of the barometers it would appear, that the range, from the most dense to the most rare state of the atmosphere, in Great Britain, is equal to the pressure of four inches of mercury, but in our country, it is rarely found to exceed one inch and a half, and in high situations much less.* Among the mountains of Virginia,

* At West-Point, the greatest variation from April to October inclusive, was 1 inch 12-100, and, except in October, i. e. in the course of six months successively, the greatest change was 8-10 of an inch.

I have seen all the changes of the weather usual in the summer months, and a range of 40 degrees of the thermometer without altering the barometer more than 1-20 of an inch. It seems to be a settled fact, that the changes decrease as we ascend, and if a barometer were to be placed on our highest mountain, it would probably be at the same height all the year round. This does not affect the principle of barometrical calculation, (which has nothing to do with changes *in the same place*,) in observing the changes in the pressure of the atmosphere at different altitudes.

I shall leave the cause of this phenomenon to more experienced observers, but hope it will not be neglected; for unimportant as the fact may appear, at first view, it may be accompanied with circumstances of a salubrious nature, well worthy of investigation. Perhaps it may be found, in some degree, proportionate to the more or less moisture of the atmosphere in different countries, or in different parts of the same country. It is known by actual experiment, that the atmosphere of the United States is less moist than that of Great Britain; and, on high mountains, it is reasonable also to suppose, that the atmosphere, being less exposed to terrestrial exhalations, is still more dry. The subject demands a minute and accurate investigation, which can only be made by a succession of simultaneous observations, at various heights, from the level of the sea to the top of our highest mountain.

JONATHAN WILLIAMS.

VI.

An Account of an extraordinary case of DIABETES MELLITUS. Communicated in a letter to JOHN COAKLEY LETTSOM, M. & L. L. D. F. R. S. &c. &c. and President of the Medical Society of London, by VALENTINE MOTT, M. D. corresponding member of the Medical Society of London, &c. addressed to the Editors of the Medical and Philosophical Register.

New-York, 8 mo. 26th, 1810.

I SEND you the following case of Diabetes Mellitus, which was attended with some very extraordinary symptoms, not to be found in any case, as far as I know, upon record. Should you agree with me as to its importance, and think it worthy to be recorded, please to give it a place in the next number of your journal.

With an ardent desire that you will persevere in your laudable undertaking, to promote the cause of general science, I beg leave to subscribe myself, your assured friend,

VALENTINE MOTT, M. D.

R. H. ætat. 9, had been affected with the diabetes mellitus, for some months, without being able to assign any cause for it, except a severe cold, which his mother recollects he caught at school, and from which time she can date the commencement of the complaint. She observed him to make a large quantity of clear, limped urine, and,

upon tasting it, found, as she feared, that it was very sweet, which convinced her it was the diabetes. Medical advice was immediately taken. He was ordered some astringent medicine, and an animal diet was enjoined, and adhered to for a little while, but he soon loathed it, and could not be made, from his untractable age, to obey their injunctions. His urine was now very sweet to the taste, and from four to six pints in quantity daily.

In this way he went on for a considerable time, without any alteration for the better, taking occasionally some astringent medicines. At length he took some of the tinct. of kino, which diminished the quantity, and altered the quality of the urine; but upon increasing the dose, it produced alarming constipation of the bowels, with violent pain in the head and general febrile indisposition, though the urine had nearly become natural, as to quality and quantity. Great hopes were entertained, that by the careful and judicious use of this powerful astringent, the disease would be totally eradicated: these highly flattering prospects soon vanished, as the moment it was increased, so as to produce any effect upon the disease, those alarming symptoms above described, immediately supervened, and made it necessary to omit it entirely. In this way he passed on, without much being done, except now and then taking some of the simple domestic infallibles of the good old mother and others, with the disease gradually on the increase.

The foregoing account was given me by his parents, who had paid more than ordinary attention to the case from the beginning.

When I saw him, which was about nine months after the complaint began, he was making from nine to ten pints of a very clear limpid urine, and very sweet to the taste, on an average daily, though sometimes it would fluctuate from nine to eleven pints, and, I believe, even twelve. He was very much emaciated: appetite, voracious for fruit: thirst, great: the urine, however, exceeded in quantity both the liquid and solid injesta. He complained of weakness in his back, which induced him to set a great deal: he was very peevish and fretful, and had a disposition to seriousness and taciturnity: pulse full, and for the most part more frequent than natural: skin dry, and frequently very hot, so that it would be at first almost painful to the sense of touch: bowels generally pretty regular, with however occasional costiveness; gums foul and spongy.

As all the different modes of treating this disease had heretofore, according to the last authority, proved generally unsuccessful,* I thought it right to advise the bleeding plan, as recommended by Robert Watt, Esq. surgeon, of Paisley, in Scotland. This I more willingly did in consequence of having been an eye-witness to its beneficial effects in the Royal Infirmary of Edinburgh, in the practice of that very eminent physician, James Hamilton. This practice was, however, thought by the parents and friends, as very inconsistent with his situation, being, as they said, then very weak, and this daily increasing, it would only hasten his dissolution. I endeavoured from

* Drs. Cullen and Heberden had frequent opportunities of seeing this disease; the former had twenty-one cases under his care, the latter twenty, and they all terminated unfavourably.

time to time to convince them of the propriety of the practice, as the case was a desperate one ; that the authority of its having been of service might be relied on, and that it was their duty, in a disease which had been generally fatal, and considered generally by medical men as incurable, to adopt a practice, which was so well recommended, and promised so happy a result.

Several weeks more elapsed, with very little alteration in the complaint, except an increase of the emaciation and debility, before it was determined to try the depleting plan of treatment. I was now requested to see him again, as his parents concluded, if it was not too late, to try my plan of treatment, as they now saw, that he would inevitably fall a victim to it, if no alteration were effected. Upon seeing him, I did not hesitate to inform them, that it was now too late to attempt it, as his debility was greatly increased, the abdomen ascitic, and the feet and legs anasarcaous. Requesting further advice, my friend Dr. Hosack visited him in consultation, and coincided with me in opinion, that his present situation would not justify Watt's depleting treatment.*

It was the result of the consultation, that he should be put upon the use of a decoction of columbo, tincture of cardamon, and a small quantity of rheubarb, as a stomachic ; six or eight grains of the exsiccated carbonate of soda, in pills, were to be taken three times a day, to see if the action it induced upon the kidneys, would not only

* Watt says these hydropic appearances are no objection to venesection ; but in this case, I thought it would not answer to venture upon it, as I was placed in a very critical situation, the practice being quite novel.

alter the quality, but diminish the quantity of urine : he was to go into a bath, as much above 98 deg. as he could bear, with a view to restore the function of the skin, and to render the bath more stimulating, a quantity of the aqua ammonia was to be added.

He wished to make a little excursion into the country to see a relation for a few days, before beginning this treatment. While absent, his parents heard of a person who was cured of this complaint, when about his age, by drinking a pint of strong alum whey, every morning, for about a month, which determined them to try it. He took nearly a pint for eight or ten mornings, when he was seized with a numbness in the extremities of his left fingers. The next day the numbness was increased, with occasional convulsions, or tremulous motions on the muscles of the fore arm, resembling chorea more than any thing else : they occurred at irregular intervals of from five to ten and twenty minutes : before evening the arm, and that side of the face, became frequently affected, so that he had considerable difficulty in expressing himself : this was very much increased the day following, when the muscles, both of deglutition and respiration, became similarly convulsed, so as very much to impede both these functions.*

Even now he had almost an insatiable desire for food and drink ; the former of which, being altogether fruit, he took by the spoon, though with great difficulty ; and the latter was sucked through a quill. I was convinced

* For the three first days, it invaded pretty regularly at about 9 o'clock in the morning, and left him about 12 at night.

from a number of observations, that the mere act of deglutition, induced a return of the convulsive affection.

In the course of the ensuing day, it began to affect the left leg, the right side of the face, and, in some degree, the right arm and leg, and was almost without any intervals: whenever it began to abate, he desired to eat or drink, and it would be as immediately renewed. He was well aware of the accession, and would desire to be held the moment it came on. It did not appear that he was in any pain, either during the continuance, or after the cessation of the convulsive motions, as not the least complaint was made.

He continued in this state for about five days, with but little alteration, except on alternate days, it would seem to remit in violence a little. The convulsive motions now were of longer continuance, and appeared to leave the muscles generally, in a more rigid state than heretofore, affecting the muscles of respiration, and those about the glottis, to such a degree, as to threaten almost an entire exclusion of air from the lungs, accompanied with a very unpleasant stertorous noise, and most ghastly visage.

In a day or two the intervals began to be lengthened, and the fits now seemed to affect the whole muscles, with a tetanic or spastic rigidity; but which stiffness and hardness of the muscles, did not prevent the limbs from being flexed, at any time, though they felt as hard as a board. When the stiffness commenced, which it did always in the left arm and side of the face, it now became almost instantaneously general, and so accurately was the action of the flexor and their antagonist muscles balanced, that in whatever position he was seized, so he remained, if not

moved, till it went off : there however was a slight tremulous motion throughout the whole body.

In this way, he continued a few days ; the intervals increasing, till about the twelfth from the first attack, when they had completely left him. Before leaving him they were sudden, and of very short duration, assuming very much the form of spasms. His pulse on the second and third days intermitted irregularly, during the paroxysms, but was synchronous with the tremulous motions of the arm and face. After this the pulse became regular and full, varying from 120 to 140 strokes in a minute. His bowels continued very regular, having from two to four dejections daily, which *a posteriori* will appear not a little remarkable. The urine during this affection was less in quantity, of a more natural colour and smell, but quite sweet to the taste.

The numbness before mentioned, which began in the fingers of the left hand, gradually extended up the arm, as was observed whenever the convulsions were off, and by the time they left him, the whole arm was entirely useless, the mouth drawn to the opposite side, and the leg of the same side paralytic ; in fact, there was complete hemiplegia formed.

Treatment.—The day after the numbness commenced in his fingers, a blister was applied to the wrist, and he was ordered to rub the hand and fingers with warm brandy, and apply it as a fomentation. It was not relieved by the next day, when the convulsive motions were frequent in the fore arm : he was ordered to drink freely of a decoction of the root of the valeriana sylvestris, and to take

ten drops of the ol. succini every two hours. I found, on visiting him the next day, that he had not taken the ol. succini, as regularly as was prescribed: the convulsive affection having very much increased, with great difficulty both of respiration and deglutition, I ordered him immediately forty drops of tinct. opii, and a tea-spoon full of vit. æther; put him into a warm bath for about ten minutes, with directions to repeat the laudanum and æther, every two or three hours, till the convulsions abated, unless a degree of stupor was produced. In the evening I found the convulsions rather less frequent and violent than in the morning. He had now taken between two and three hundred drops of the tinct. opii, and æther in the same proportion. Ordered the tinct. opii and æther to be continued, and likewise the valerian root tea.

Next morning, at 8 o'clock, he was perfectly quiet and comfortable, and I found he had been so since 12 o'clock. He lay in a quiet sleep, and, upon being waked, did not complain of any uneasiness in his head or stomach. Anticipating its return, about 9 o'clock, he was ordered sixty drops of tinct. opii, and a tea-spoon full of æther, immediately; but, notwithstanding which, it supervened about nine, with all its previous violence. The tinct. opii and æther were continued in large doses, and he took five drops of the arsenical solution every two and three hours. In the evening, there being but little alteration, all were continued as before: he had taken about five hundred drops of the tinct. opii, through the day.

Upon seeing him the next day, I found he had taken the arsenic pretty regularly, as likewise the tinct. opii, æther, and valerian root tea; but there had been no intermission since the last visit. As he had taken in the

course of the last day about seven hundred drops of laudanum, I thought it best to try the effect of some of the other antispasmodics, and accordingly ordered him camphor and castor, each seven grains, every two hours; to continue the laudanum and æther, but not so often as before. The arsenic was the next day omitted, at the particular request of the parents.

Several days now elapsed, without any particular alteration. All the medicines were continued in larger doses, except the camphor and castor, which he refused to take, after the second day of its exhibition. He now took from ten to twelve hundred drops of the tinct. opii, in the course of the day. Frictions with æther and laudanum, hot brandy, and fomentations of the latter, were frequently made. As the medicines appeared to have very little effect upon him, I prescribed two grains of the oxyd of zinc, every three hours, at the same time to continue the tinct. opii. But little of the oxyd of zinc could be given him, as he refused to take any thing but the tinct. opii, which was now continued in smaller quantities, as the affection seemed on the decline. Before it entirely left him, he only took between two and three hundred drops in the course of the day.

During the whole course of the complaint, his bowels continued very regular, nor was his stomach or pulse affected, notwithstanding the large quantity of tinct. opii which he took.

A state of coma succeeded the subsultus, which was of several days continuance: though frequently he would open his eyes and ask for drink, and continued now to eat

very freely of his berries and milk. It was evident now, that the power of motion of the left side was entirely lost.

About the sixth day, after the convulsive affections ceased, his eyes appeared for the most part fixed, now and then staring about in a very wild manner: his pulse was much sunk: he did not ask for drink, and, for the most part, refused it when offered, as there appeared to be great difficulty in swallowing. By the use of strong wine-whey, and spiced wine, as freely as it could be got down, he was in a day or two considerably revived, so that he ate and drank more freely again. The diabetic symptoms still continued, in proportion to the quantity of *injeta*. For several days he was unable to turn himself in bed, and as he lay upon his back, kept the well knee drawn up. A day or two after this, he was seized with great oppression in breathing, from an effusion of mucus into the bronchiæ, which he was unable to expectorate, and terminated the scene, about three weeks after the convulsive affection left him.

V. MOTT.

VII.

OBSERVATIONS *on the beneficial effects of MERCURY in TYPHUS, which occurred on board the frigate Constellation, on her passage from the Mediterranean; in a letter to Dr. W. CURRIE, from Dr. ED. CUTBUSH. Communicated to the Editors, by Dr. CURRIE.*

Philadelphia, April 25th, 1804.

DEAR SIR,

WITH pleasure, I communicate to you, the good effects of mercury in the treatment of typhus, on board

the United States' frigate *Constellation*. I would have performed my promise ere this, but my baggage, which contained my notes, did not arrive in Philadelphia, until a few days since. I shall not intrude on your time and patience, by tracing the origin of the disease; neither do I think it necessary to enter into a minute description of the various symptoms, as they occurred in various constitutions: the outline, I presume, will answer your purpose.

This disease commenced with more or less chill, alternating with heat, accompanied with an inactive, listless disposition; pain in the orbits of the eyes and forehead; giddiness, with great prostration of strength; pains in the back and limbs, particularly the lower extremities: some complained of acute pain in the thorax, with anxiety: the eyes were of a muddy, red, appearance, and suffused with tears; tongue furred and tremulous; pulse small and frequent; in some cases, a fullness was felt on the first and second day. As the disease advanced, the prostration of strength encreased; the stomach became extremely irritable, with some pain; the most bland fluids were ejected; the tongue changed to a leaden hue, in some it was black; the teeth were also covered with a dark coloured crust. The skin and eyes became yellow on the third or fourth day: the voice was so low as scarcely to be heard; deafness; subsultus tendinum; hiccup; convulsions; swellings of the parotid glands, with dark coloured blisters in the mouth: petechiæ appeared on several; and there was a hemorrhage from the ear and bowels of one man; in two, the discharge from the stomach resembled coffee-grounds. In many cases, the bowels were obstinately costive: more or less delirium

commenced with the disease. Some, after their recovery, were attacked with violent ophthalmia. In some instances, the pain complained of, in the extremities, continued many days, after a complete recovery from all febrile symptoms.

The mode of cure, which I adopted, I conceive new, having never met with any authority recommending the mercurial treatment in *Typhus, or Ship-fever*. I remembered to have read a passage in Clarke, on long voyages, advising the trial of mercury, in the advanced stage of this disease, "when an *engorgement* of the brain takes place." I therefore determined, instead of waiting for this *generally* fatal state, to commence the cure by administering mercury in the place of the usual remedies, bark, wine, &c. &c. As soon as I was applied to, five, ten, or fifteen grains of calomel were given, combined with a sufficient quantity of tart. emetic, or ipecacuanha, to ensure a copious discharge from the stomach and bowels. The calomel was repeated at night, combined with opium, or pulv. Doveri: during the day, it was given in doses of two or three grains, every two hours, (care being taken to prevent it from running off by stool) until the mouth became touched, which, excepting in three or four cases, never exceeded the fifth or sixth day; in some instances, it was sore on the second. To effect this as soon as possible, I directed the body and extremities to be sponged with *cold* vinegar, or spirit and water, which seldom failed to determine the mercury to the salivary glands: in a few instances, I found it necessary to employ mercurial ointment. Blisters, when any were applied, were also dressed with it.

With singular pleasure, I beheld its powerful effect. No sooner were the gums slightly sore, than every dangerous symptom vanished : it operated like a charm : the irritability of the stomach, which was extremely distressing, and which had defied the power of saline effervescing and alkalescent mixtures ; camphor, opium, solut. of vit. alba, (as recommended by M'Clean) and blisters to the stomach, yielded to the conquering power of mercury. The dark crust, which covered the tongue, peeled off from the edges first, then from the centre ; the skin, which before the exhibition of mercury, imparted a burning, dry sensation to the fingers, now became soft and gently moist. Thus a disease, which frequently continues for weeks, was cut short by this powerful remedy. Many were free from disease, except debility and sore gums, on the fifth day ; very few exceeded the seventh.

Barley water acidulated with lemon juice, also weak *gentian* or *snake-root* tea, were given as common drink ; very little wine was used until the convalescent state commenced, which I dated from the time the gums became sore, and then, it was given with a decoct. cort. peruv. or with sago, tapioca and gruel : rice, chocolate, barley, and portable soup, composed the chief diet of the sick. In a few instances, I found it necessary to order the head to be shaved, and blisters to be applied, otherwise I did not make that general use of them as recommended by Lind and others.

Of seventy-three men attacked with this disease, three died : their deaths happened on the fifth, seventh, and thirteenth day. The last had a swelling of the parotid glands, which suppurated partially : bloody pus issued from the

ear; gangrenous spots appeared on the ears, cheek, tongue, and fauces. I am sorry to add, that the violent pain in the thorax, with anxiety, together with a fuller pulse than common, induced me to bleed these men, and four others, at the commencement of the disease, before I placed that confidence in the mercurial treatment, which success afterwards established.

I had been in the habit of drawing blood freely on the commencement of fevers, both in the West-Indies and Mediterranean, with success; but, in this disease, it was most assuredly pernicious: perhaps, in other climates, it may prove useful in typhus; indeed, the authorities in its favour, place it beyond a doubt. It was evidently injurious in three cases: violent delirium came on immediately after, which ended in coma, from which the patient could not be roused: it also rendered the cure more tedious in three other cases. Nevertheless, could the systems of these three unfortunate men have been mercurialised, I am very confident that they would now be living monuments of the good effects of mercury.

It is worthy of remark, that there were several suspicious cases on board, in the months of December and January, 1802 and 3, when in Gibraltar bay. The weather had been very boisterous and wet, for some time, but the disease did not spread until the 11th of February, when on our passage to America. Many days previous, we were under the necessity of having the hatchways closed, in consequence of heavy rains and gales. Every precaution was taken to procure a current of fresh air betwixt decks: fires were also lighted, to dissipate moisture. The disease spread so rapidly, that, in a few days,

forty-nine were confined to their hammocks. As we approached the coast of America, in the month of March, our sick list diminished: the weather was very cold; we had several frosty nights, which appeared to have a *very powerful effect* in diminishing the number of sick. When we arrived in the Potomac, there were very few, except convalescents, on the sick list.

Several persons were affected by going into the sick apartment, contrary to orders. One gentleman received the infection by inhaling the air which passed through a scuttle which communicated with the sick birth.

The ophthalmia which followed, in many instances, was very obstinate. *Topical blood-letting* had very little effect; collyria were useless, except for the purpose of cleansing the eyes from a puriform discharge, which was constant. A blister applied to the *forehead*, was the only certain remedy, for this distressing complaint.

Whether mercury cured, by stimulating the system generally, or particularly the glandular system; or, by creating and supporting an action different from the morbid; or, by creating a new disease; I leave to your theoretical genius to determine.

I trust, sir, you will excuse the hasty manner in which these remarks have been thrown together.

With sentiments of sincere respect,
I have the honour to subscribe myself,
Your humble servant,

DR. WM. CURRIE.

ED. CUTBUSH,

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VIII.

CONJECTURES *respecting the* ORIGIN of ENDEMIC
FEVERS. *Addressed to the Editors of the American
Medical and Philosophical Register, by a* SERIOUS
ENQUIRER.

Philadelphia, October, 1810.

THE question of foreign or domestic origin of the pestilential fevers, which have so frequently desolated several of our cities, within eighteen years past, seems to have been put to rest, for some time, by the bold assertions, without proof, of those, who, having hastily formed and published their opinions, are unwilling to have the subject further investigated.

The following thoughts were committed to writing seven or eight years ago, and have been occasionally shown to many friends, who will recognize them, although they are somewhat enlarged from the first copy. They would, probably, have remained in the writer's port-folio, had he not casually met with the prospectus of this work, of which a prominent object is to establish the line of distinction, between those diseases which are of a foreign source, and such as are engendered at home. With a view to promote serious enquiry, the writer submits them to the public, hoping that *his* diffidence will not be considered a sufficient cause to condemn them unconsidered.

Fevers which are endemic, in countries where stagnant waters are exposed to the summer heats, have, generally, from the most ancient medical records to the present time,

been attributed to miasmata exhaled from marshes or other putrescent waters.

I have searched, in vain, every lexicographical work, that is accessible to a man in the ordinary walks of life, for a description of miasm. The first I looked into was Johnson's dictionary, where I found that it was derived from the Greek verb *Μιαίω*, signifying to infect. Hedericus, in his lexicon, renders the word *Μίασμα*, "inquinamentum contagium," &c.* The Encyclopædia Britannica has "Miasma, among physicians, a particular kind of effluvia, by which certain fevers, particularly intermittents, are produced." This definition throws little light on the subject, and all that can be collected is, that miasm is infectious, and that it is an effluvium from something.

Here a question naturally occurs, is it a gaseous exhalation, raised by the warmth of the atmosphere from some colder body? or, by effervescence from terraqueous matter, in a state of fermentation?

I am not sufficiently versed in the science of chemistry to resolve this question, *secundum artem*, or even to my own satisfaction; but, from the little I know, by reading, by attending a few lectures, and by my own observations and reflections, I incline to the opinion, that the miasmata in question, are not gaseous. Fixed air, collected in mines, deep vaults, large brewers' working vessels, or in close chambers, by means of burning charcoal, will destroy animal life instantly by inspiration; and inflammable airs,

* In Constantine's lexicon, I find *Μιαίω*, fido, polluo, contamino, *Μίασμα*, impuritas, piaculum, scelus.

confined in mines, when they take fire, will somehow have the like effect; but, I have never found an instance on record, of either fixed, or fœtid, or inflammable airs, in the open atmosphere,* producing disease. If this were the case, one would suppose, that the slaughter-houses of butchers, would, in the summer season, in this climate, be as destructive to their owners, as their knives are to their cattle: for no one can approach a slaughter-house from the leeward, without feeling an effluvium of such strength, as to render respiration almost intolerable to nostrils and lungs not accustomed to it.† Yet, however offensive the vicinity of slaughter-houses may be, I have never heard of their being the sources of infection, otherwise than, as their sites are usually chosen for the benefit of a drain into some water-course, they may partake of miasmata from other causes than their own fœtor.

Before I proceed farther, I will candidly confess, that my knowledge in pneumatics and physics, is very limited; and that, if gentlemen, whose profession has led them to consider the subject in this point of view, are prepared to answer my objections, I am willing to stand corrected, withdraw my theory, and yield to the more expert.

Having thus, like a cautious general, secured a retreat,

* I suppose that all the airs, lighter than the atmosphere, have such a tendency to dissipate, that if noxious in themselves, they would soon be so attenuated, by mixture with the atmosphere, as to become harmless.

† I have always considered it as one of the inscrutable wonders in the formation of man, that the lungs, inhaling the most fœtid and polluted airs, are qualified to extract *only* what is wholesome out of them, and to eject the rest.

in case my ignorance of the ground I am exploring, should render it necessary, I proceed to enquire, what are these miasmata which have been in the mouths of physicians, from the time of Hippocrates to the present, without a definition that I can discover in any book that has fallen in my way.

The effluvia from musk, from camphor, and from assa-fœtida, are generally supposed to be particles of the matter composing these substances : the impregnation of wine, by glass of antimony, is accounted for in like manner ; and they are all adduced by one writer or another, as illustrations of the infinite divisibility of matter : but, of what matter are *these miasmata*, infinitely small portions ? of the stagnant waters ? or, of the vegetable substances, putrified in the water ? or, what else are they ?

I am aware of the importance of these questions, and will endeavour to treat them with becoming seriousness.

The whole christian world professes to believe in the infinity of the supreme being ; and, when we turn our eyes to the heavens, we are lost in admiration and astonishment, at the immensity of *his* works, wherein our own solar system is but as a point, compared to even what *we* can see of the stupendous whole : but *his* infinity is equally unfathomable in the descending climax ; and there are, perhaps, among *his* wonders, as many which are concealed from the organs of our sight, by their infinite* minuteness, as by their infinite* distance from us.

* I use the word infinite, in these two places, not in its absolute sense, as when applied to the Creator, but in a mathematical sense.

Some ages have elapsed, since telescopes and microscopes have enabled our weak vision to penetrate the heavens, in search of distant worlds, and the mosses on which we tread, for the inhabitants which live in their shade, and feed on their fruits : but the concluding portion of the last century, was favoured with the invention of instruments, which render us familiar with suns beyond the galaxy, and with myriads of animated beings, inhabiting the chrystal streams which water the earth ! In the earlier moiety of a life, now in its grand climacteric, my profession led me to travel often through the peninsula, bounded by the Delaware and the Chesapeak. Frequently passing through a flat country, in the summer months, when the ground, wet with a copious rain, not yet drained from the surface, the woods creating a partial shade, and the sun approaching the western horizon, I have seen the atmosphere shining with innumerable gilded motes, almost filling the visibly illuminated space before me, as a partly shaded chamber, through which an open window admits his rays, exhibits the fragments of down otherwise invisible. The question, *what are these ?* has been suggested to my mind, and intuitively answered, they are the hosts of *him*, who, in the beginning, said, " Let the waters produce moving creatures having life, and winged creatures flying above the earth in the open firmament of heaven, and it was so."* I had then no idea of the microscopic animalcules, but of the mosquitoes, the gnats, and other insects which, though very minute, were, under some circumstances, visible to our organs, or felt on our skins.

When the dreadful pestilence had several times infect-

* Thompson's translation of the LXX. Genesis i. 20.

ed our own and other cities on this continent, a participation, not small, in the common calamity, induced deep thoughtfulness on the subject. After much research, and little light from books, the idea of animalcular miasmata was suggested to my mind. The longer I pondered it, the more deeply was I impressed with the probability of the theory. I mentioned my suspicions, on this subject, to Dr. Samuel Cooper, of Philadelphia, just before he entered upon the perilous duty of physician to the public hospital, which so speedily terminated his valuable life. His concurrence, in the idea of its probability, strengthened my opinion, and caused further and deeper consideration of it.

Looking into the *Encyclopædia*, and some other books, to assist me in my ruminations, I found that the idea of animalcular origin of the plague, and some other diseases, was broached long ago, and had fallen into discredit. This did not discourage me, for I knew that the Marquis of Worcester's invention of the steam-engine, had fallen into discredit, for nearly half a century, when it was revived by captain Savery, and, being since improved by Bolton and Watt, has become almost an universal agent in British manufactures; and here, the most powerful momentum for travelling.

My theory then is, that water (however pure, or even if frequently distilled, in order to kill all animal life that might previously have existed in it) in which any animal or vegetable substance is placed, and subjected to a heat of seventy to ninety degrees of Fahrenheit, will, at the end of two or three days, contain innumerable tadpoles, of different forms and species, invisible to the naked eye:

that these tadpoles, in their appointed time, burst their skins, and arise into the air in innumerable, repeated broods of invisible winged insects, possessing a quantity of virus, proportioned to the degree of heat contained in the vegetable, which was the nidus of their egg,* and of the atmosphere, which was their incubent force : that the poison may vary according to the variations of the climates, and the different modifications of the atmosphere, in the same climate, thereby producing different degrees of the infecting quality, and, of course, different grades of disease.

In the temperate zones, where there is an alternation of heat and coolness, by day and night, and winter and summer, it would not be expected that vegetables or animals, of the same genus or species, should be of the same temperament, as in the tropical regions, where the climate is under the permanent dominion of heat throughout the year. Thus we find, that almost all the vegetables called tropical, have more pungent tastes, than those of tempe-

* William T. Smith, a gentleman of unquestionable credit, who owned a coffee-plantation in St. Eustatia, informed the writer, that wet coffee was so destructive to the negroes, that if they had the slightest scratch on their skins, when they were handling it, they were sure to lose their fingers or hands, the coffee-water corroding the flesh into the bones : many of his slaves became useless or died by these means. May not this have been effected by insects generated in the wet coffee ? And is it not probable, that the festering of green wounds may be caused by these animalcules in the air ? And may not the sediment found in distilled waters, kept close, be composed of these animal tadpoles, which have perished, by not having an opportunity of escaping into the air, at the due time of bursting their skins ? Or, the skins of them, if the winged insects have escaped ?

rate climates, witness their peppers, spices, melons, ananas, and many other fruits : most of their flowers, and birds, are coloured with brighter tints, of green, gold, and scarlet ; as their flamingoes, parrots, parroquets, and others. Their vegetable and animal poisons, are much more deleterious than those of temperate climates, as their manchineel, and other plants ; centipes, lizard, viper, cantharis, spider, and many other animals, and insects.

The varieties of fever, observed by physicians, in the peninsula of Delaware and Chesapeake, according to the variations of heat and moisture, are,

1st. A *wet, cool* summer and autumn, produces the slightest degree of intermitting fever, commonly called the fever and ague ; against which the poor take little precaution or remedy, but suffer it to take its course, until the cool weather braces them, and restores their puny health.

2d. A *wet, hot* season, produces an intermittent more difficult of cure, the quotidian, tertian, or double tertian.

3d. A *dry, warm* season, produces the bilious remitting fever of these climates ; a long, painful, and dangerous disease : and

4th. The putrid bilious fever, is generated late in the autumn, and continues into the winter, after a season uncommonly hot.

These varieties are known, under the varying circum-

stances of the seasons, to the physicians of the peninsula, with many of whom I have often conversed.

It is well observed in the *Encyclopædia*, that while these animalcules are in the water, they are fixed, and by putting a drop on the stage of the microscope, they can be carefully examined, and their forms observed and delineated ; but when they rise into the air, they are no longer subject to our inspection. Having, however, ocular demonstration of their actual existence in the water, I presume, it is not unfair to trace their progress and effects, when they escape into the air, by analogy. Mosquitoes and gnats are visible in their tadpole and winged states : the natural history of the former, is well known to every man of moderate observation, throughout the country : the female of the species is seen, in the months of May or June, according to the warmth of the season, depositing its eggs on the surface of our cisterns, and on all sheltered, stagnant waters : in a few days, innumerable tadpoles are seen in the water, at or near the surface : upon the slightest disturbance, by touching the vessel, they, by a semicircular motion, sink themselves to the bottom : if the weather continues very warm, a few days more suffice them to burst their skins, and they come out, in innumerable, incalculable swarms, a winged, poisonous insect : when first come into their new element, they are extremely light and semipellucid, and, perhaps, a thousand of them would not weigh a grain ; yet, each of them, is furnished with so subtile a poison, that where his proboscis penetrates a human pore, a venomous swelling, attended with considerable pain, ensues ; and, it is a well known fact,

that sheep, newly shorn, are frequently killed by numerous bites of them.*

Now, if this insect were invisible, might not numbers of them be drawn, by the inspiring breath, into the mouth; many of them adhere to the saliva in the fauces; be carried with that into the stomach; there, adhering to its coats, operate, by their poison, to excoriation, and create the inflammation† which has been found in the stomachs of all the subjects of yellow-fever, which have been dissected after death, and whose cases have been published.

The mosquito is visible, extremely shy, and makes a disagreeable noise; its sound, grating to the ear, warns us of the danger, and, when we are involved in a cloud of them, we cover our mouths to prevent our swallowing them; so that they have never been suspected of creating internal disease. Now, knowing, as we certainly do, that in the tepid waters of our pools, ditches, gutters, and cisterns, there exist other innumerable species of tadpoles, so infinitely small, that myriads of them, in a drop, do not prevent, or sully, its transparency, is it straining analogy too far, to suppose, that they also, like the larger mosquito, burst their skins, and come forth in infinite swarms, thickening the air without our perception: that they par-

* The writer was a witness to this, in the county of Sussex, Delaware, and, expressing his surprise, was informed, that it was not an uncommon case.

† From the accounts published, of the state of the stomach, in all the cases of dissection of the yellow-fever, I have been led to think the disease may be denominated a true gastritis, or inflammation of the stomach, by means of acrid matter taken in; and poisonous, invisible insects, seem a cause adequate to the effect.

take, like the mosquito, of poisons of various grades, according to their nature, and the degree of heat that has hatched them : that these filling the atmosphere, above all fenny places, are the miasmata of Hippocrates, and of all the physicians, ancient and modern ; and produce every grade of fever, of the kinds sought after, from the mildest intermittent to the most virulent tropical fever, or even the plague, corresponding with the climate of their birth ?

Under the impression of these ideas, I would thus trace the introduction of the yellow-fever, of 1793, into the city of Philadelphia. I will, with Dr. Chisholm, suppose, that under peculiar circumstances of concentrated heat and animal filth, on board the slave-ship *Hankey*, on the coast of Africa, the insects forming the miasmata of that climate, produced a brood unusually venomous : that in the ship, or its atmosphere, a considerable number of them were transported to the island of Grenada, the southernmost of the Charibs, or Antilles, where, finding a congenial climate, they soon propagated their species, in infinite numbers, and spread themselves, either by their own flight, by the course of the trade wind, or by transportation, in vessels, from island to island, in that vast polynesian semicircle, till they reached Cuba and Jamaica, the Floridas and Louisiana ; from most of the ports of which, vessels were continually trading to the port of Philadelphia : that one, at least, of these vessels arrived at Philadelphia, in July, 1793, having, in her hold, a great quantity of coffee ; that she had also, under her hatches, a considerable volume of the warm atmosphere of that climate, replete with these invisible animalcules, of the most poisonous grade ; that the bilge-water, in which damaged coffee was plentifully infused, was continually breeding innumerable and

successive swarms ; that upon the arrival of the vessel at a wharf, near Sassafras-street, and opening the hatches, these swarms flew out ; infected the persons who first came within their reach* ; proceeded immediately to deposit their eggs, in every puddle or gutter of the neighbourhood ; and spread themselves, from wharf to wharf and street to street, until, in the short space of three or four weeks, the whole atmosphere of the city and districts was polluted by living miasmata, which reigned till about the 28th of October, when a sharp frost put an end to the foreigners, incapable of bearing the rigours of a climate not their own.†

Si quid novisti rectius istis
Candidus imperti : si non his utere mecum.

M. F.

* It is remarkable, that those few, who first are taken, by coming within the sphere of the imported miasmata, all die. Twelve or fourteen days intervene, before the swarms generated here give a second infection : of these, some are known to recover ; and, the further the season advances, the less virulent is the disease ; the new broods, in every generation, partaking more and more of the coolness of autumn, become gradually less poisonous, infect fewer patients, and those more slightly.

† The whole of this paragraph, has been added, since I read the criticism on Dr. Chisholm's letter to Dr. Haygarth, in the Register, No. I.

IX.

OBSERVATIONS *on the Means of Preserving the Commerce of New-York.* Addressed to the Editors of the *American Medical and Philosophical Register*, by MERCATOR.

You have published some remarks, signed *An Observer*, shewing the great advantage of transporting produce, by canals, instead of the present mode of transporting it, by waggons. The calculations, on this head, seem to be conclusive and satisfactory ; but the writer has, incidentally, touched on a subject that seems to require more attention than he has given it. It is a subject, as I think, that demands the serious attention of the legislature. The Observer alleges, that it would be imprudent to bring produce, by means of a canal, from lake Erie to lake Ontario, lest that produce, being once afloat upon lake Ontario, should find its way to Montreal, by means of the river St. Lawrence.

Considering the subject, as I have done, since I read those remarks, I am fully persuaded, that one half of the produce, and one half the commerce of the state of New-York, must go into Canada, unless it be prevented by an extensive western canal, and by another canal from the northern wood-creek into the navigable waters of Hudson river.

If the reader will be pleased to cast his eyes upon a map of this state, and to draw a line, from the vicinity of Glen's falls, on Hudson river, to lake Oswego, he will

discover, that the lands which lie to the northward of that line, and to the westward of lake Oswego, constitute a good deal more than half the continental part of this state. He will also discover, if he makes a careful examination, that the produce, from all the lands thus described, may be carried, at a less expense, to the navigable waters of the river St. Lawrence, than to the navigable waters of Hudson river.

I deem it certain that, according to the present state of our navigation, all the produce that is carried to lake Champlain, must, infallibly, be shipped at Montreal. The navigation of lake Champlain is perfectly safe, for large vessels, as far as the town of St. John. The outlet of the lake, called the river Chamblee, from St. John's to the river St. Lawrence, abounds in rapids; but the distance from St. John's to the river St. Lawrence, at Montreal, is not above thirteen miles, in a straight line. The present crooked road is somewhat longer; but a turnpike road, or a canal, is to be made. The expense will not be much, for that neck of land is a perfect plain. The reader is not to be informed, that such a portage will not be a tax of any consequence upon produce, viz. upon the produce that is carried in barrels or bags: for lumber may pass, in rafts, down the river Chamblee, and thus go directly to Quebec. Nor is the reader to be informed, that though the tides in the river St. Lawrence do not come within less than ninety miles of Montreal, yet ships of three hundred tons burden come to that city, so deep is the natural stream of that river. The reader, as I take for granted, knows that the distance from lake Champlain to Waterford, on the highest navigable water of Hudson river, is about sixty miles.

It is not worth while to use a single argument to prove, that produce, once afloat on lake Champlain, will never be carried sixty miles, by land, for the sake of shipping it at New-York, when it may be shipped at Montreal, after a land carriage of thirteen miles. Nor is it worth while to use many arguments to prove, that most of the farmers, to the northward of the line above described, will carry their produce to some part of lake Champlain, as the nearest market. It needs hardly be remarked, that the whole produce of the state of Vermont, or that part of it which lies to the northward and westward of the mountain, must go to lake Champlain, and proceed in the course that has been described, unless effectual means are taken to bring it into Hudson river.

I am now to consider, what will be the probable fate of produce that is once afloat on lake Ontario. The distance from Kingston, on lake Ontario, to Montreal, by water, is about two hundred miles. There are sundry rapids in the river St. Lawrence, but they are not dangerous ; for there has not been, as I think, more than one boat lost, in descending that river, during the last seven years. That boat, loaded with pot-ash, was lost by striking a noted rock, called " Le Cheval Rouge ;" and she was lost, because the owner obstinately refused to take a pilot, above the rapids. A circumstance, that caused some passengers, very prudently, to leave the boat above the rapids. It is known, that those several rapids may be shunned, by making a short canal, and a single lock. One canal is already made for the benefit of boats going up the river.

A pretty good estimate may be formed of the navigation of the river St. Lawrence, above Montreal, as it is

found at present, without any material improvements, from the following facts. The constant freight of a barrel from Kingston, on lake Ontario, to Montreal, is two dollars : the freight from Montreal to Kingston, is three dollars ; such is the difficulty of ascending the river. A large boat or scow, that carries from five hundred to seven hundred barrels, may be purchased at Kingston, where they are built, for one hundred and seventy dollars. Those boats are sold at Montreal for the value of the timber of which they are made. Dry-goods and West-India produce are taken up the river, in boats of a different construction. I have said, that freight from Kingston to Montreal comes at two dollars the barrel, but a barrel cannot be estimated at less than two hundred weight, whence it follows, that freight from Kingston to Montreal, comes at one dollar the hundred weight. But many of our fellow citizens know, to their grief, that portage of produce, by waggons, from Geneva to Albany, costs two dollars the hundred ; and, it happens a little unfortunately, that freight, by the canal, and other waters, from Geneva to Schenectady, costs a little more. Is it necessary to consider, whether people who live near Geneva, or in any of the northern or western parts of this state, will not, in all probability, send their produce to Montreal in preference to the Albany market ?

Perhaps the reader may be surprised when he is told, that a company is lately formed, who undertake to convey produce, from the border of the state of Ohio, or the upper end of lake Erie, to Montreal, for one dollar and three quarters the hundred weight : that is to say, the farmer, who lives at the upper end of lake Erie, will send his wheat to a shipping port, at a less expense, than it

can be sent, at present, from the town of Geneva to Albany.

Perhaps I shall be asked, whether this be a new discovery ; or whether the danger of losing the commerce of our own citizens is greater now than it formerly was ? to this question I answer, decidedly, in the affirmative. The danger is much greater than it was a few years ago. There was a time, not five years ago, when our fellow citizens had no intercourse with the inhabitants of Montreal. They were not acquainted with these people, and had not formed any connections with them. All their pot-ash, wheat, flour, and salted provisions, were sent to the borders of Hudson river to be exported. There was a wealthy company of British merchants in Montreal, but their speculations were entirely confined to a trade with the Indians, from whom they obtained peltries and furs. The native Canadians had little to do with commerce : they are bad farmers and worse merchants.

The spirit of adventure, that is so common among our fellow citizens, and the desire of gain, that in all countries is too apt to induce men to violate municipal laws, when the prospects are very flattering, has made a complete revolution in the former state of our northern and western commerce. Pot-ash became dear in England, during our embargo, and the price of that article and of flour, salted provisions, and lumber, was considerably depressed in the United States. Our fellow citizens, in that case, discovered a new vent for their produce. Those articles brought a good price in Montreal, and they found little difficulty in smuggling a considerable quantity of produce to that city. When a man is once engaged in a prohibited

commerce, he seldom discovers a barrier at which he should stop, except it be a barrier that cuts off his profits. We know that the price of dry-goods was greatly increased in the United States during the embargo, but the price in Canada was moderate : hence the practice of smuggling dry-goods from Canada became very frequent. In that case, traders, on the opposite sides of the line, became acquainted with one another, and mercantile connexions were formed. Every farmer was taught that there was another channel, beside Hudson river, through which his produce could be exported. In the common expectation, that the revolution above mentioned, will be complete and permanent, many citizens of the United States have lately settled in Montreal, and others are preparing to follow them. Those people have their friends and connexions in Vermont, and in the northern parts of this state. They know how to promote that commerce, and they look with confidence to a time, not far distant, when Montreal will become a great commercial city.

Hitherto I have been speaking, as the reader observes, concerning the loss that must be suffered by the city of New-York, and by the trading part of this community, from the circumstance of the produce of our state, or a great part of the same, passing into a new channel, whereby the whole profits of commerce will pass into the hands of foreigners. The merchants, ship-builders, smiths, and numerous other mechanics, of another nation, will be enriched at our expense. But there is a further point of view, and that a very interesting one, in which this subject is to be considered. The revenues of the United States will be materially affected by this new course of trade. When the produce of our farms is sent to Mon-

treal by some of our country traders or merchants, it is not to be expected, that they will bring back the proceeds from Canada, to buy goods in New-York, that are burdened with a duty of somewhat more than seventeen per cent. ; that would be a stretch of patriotism that we are not to look for. It is well known, that during the embargo, the value of dry-goods smuggled into this state from Montreal, greatly exceeded the value of all the produce that our citizens smuggled, across the lake, to that city. We paid the balance in gold or silver. We have not any materials, from which a correct estimate can be formed of the annual loss that is likely to be sustained by the smuggling of goods from Canada ; but there are materials from which we may form a pretty good conjecture.

The duties upon goods imported into the city of New-York, in the year 1807, were seven millions, six hundred and thirteen thousand, six hundred and ninety-nine dollars. The drawback upon goods exported amounted to two millions six hundred and sixty-eight thousand four hundred and fifty-six dollars. It follows, that the goods consumed in the country, paid a duty of four millions nine hundred and forty-five thousand two hundred and forty-three dollars. It is believed, that the duty of one million of dollars may have been paid on the West-India produce imported that year, and not exported. Such articles are not smuggled. There remains three millions nine hundred and forty-five thousand two hundred and forty-three dollars that seem to have been paid for dry-goods imported. I presume that two thirds of those goods may have been sold into some of the other states, and that one third of them was consumed in this state. The duty on one third, came to one million three hundred and fifteen

thousand and eighty-one dollars. I presume that at least one third of the dry-goods consumed in this state, is used in the upper counties ; the duty on that proportion was four hundred and thirty-eight thousand three hundred and sixty dollars : but as the same quantity is to be smuggled in future, it will follow, that the national treasury may lose, about four hundred and thirty-eight thousand three hundred and sixty dollars, per annum, by the new course of commerce. Perhaps I shall be told, that smuggling, such as I have alleged, may be prevented by a custom-house on lake Champlain, and at ten or twelve other places : the person who advances this opinion must have little acquaintance with human nature, or with the country to which I refer. Smuggling on the sea coast is easily prevented, because goods are imported in large vessels, that may be seen at a great distance, and cannot land but in particular places ; and the smuggling of a single bale, besides its being attended with perjury, may endanger the whole vessel and cargo. None of these circumstances can take place on the northern frontier. There is an imaginary line, upon dry land, at least one hundred and fifty miles long, in the forty-fifth degree of latitude, that divides the states of Vermont and New-York from Lower Canada. Goods may be passed, with the utmost facility, across every part of that line, except the very spot where the custom-house officer is stationed. No man swears on the occasion, and no vessel is endangered by the project. The goods are safe when they are across the line, for there is no distinguishing mark upon a piece of smuggled goods. After that imaginary line has reached the river St. Lawrence, there is an additional line, some hundreds of miles long, passing up rivers and lakes to lake Superior, by which the states of New-York, Pennsylvania, Ohio, and

the upper territory, are divided from Canada. Does any man say, or pretend to think, that the national government can prevent goods, to the utmost amount, from being smuggled across that extensive line? They might as well prevent the migration of squirrels, wolves, and bears. Perhaps it may be objected, that men will not take the trouble of carrying goods through the woods, or along private roads, or landing them in boats along the shores of rivers or lakes, for the small profit that is to be made by that business. I have only to enquire of such objectors, whether they are acquainted with any branch of business that is much more profitable? whether a clear profit of seventeen per cent. is not rather more than the honest trader commonly makes? whether he has not heard of the destructive heights to which smuggling, not more profitable, has arrived in other countries? I ventured a conjecture, that the revenue of the United States is like to suffer a loss, or a reduction, of four hundred and thirty-eight thousand three hundred and sixty dollars, per annum, in consequence of the goods that, in the new course of trade, may be smuggled into this state; but the goods that may be smuggled into Vermont, Pennsylvania, Ohio, &c. may be estimated at a similar sum, making in the whole, at least, eight hundred and seventy-six thousand seven hundred and twenty dollars per annum. How is this heavy loss of revenue and grievous depravation of morals to be prevented? I conceive that the only possible remedy will be found in the two canals mentioned, and that they would prove an effectual remedy.

When we consider that a ship can readily make two voyages in the year, from New-York to the West-Indies, or Europe; but that she cannot make more than one voyage

in the year from Montreal, owing to the difficulty of stemming the constant stream of the river St. Lawrence, and the length of the obstruction by ice ; we must discover, that the merchant, in Albany or New-York, can afford to give more for bulky articles, such as wheat, flour, or pot-ash, than the merchant in Montreal. Hence it will follow, that if canals were made by which our fellow citizens might be enabled to bring their produce to Albany, for the same price that it can be taken to Montreal, every bushel or barrel of it would come to Albany. The farmer does not enquire where the cheapest dry-goods are to be purchased, but how or where he can get the best price for his produce ; because, in all cases, some part of that produce is to be converted into cash, which is to be employed in paying for his lands, his taxes, or other purposes. If the certainty of a better price, though it were but six per cent. the charges being the same, shall bring the produce to Albany, we may be assured that no part of the proceeds will ever be sent to Montreal for the purpose of smuggling goods. I am not to learn that another and a very different expedient has been proposed. Whoever attends to the debates in Congress, must have observed, that some warm and active members have proposed an expedition into Canada, for the sake of taking that province. This measure, as the parties allege, would be an effectual remedy against the loss of trade in that quarter. They also conceive, that we should strengthen the union, by the addition of two or three states, composed chiefly of Frenchmen. The fathers of this project may conceive, that by taking Canada, all the commerce of the river St. Lawrence would be carried on by citizens of the United States : but I deem it certain, that no prudent man, who lives in New-York, could wish that all the commerce of

the northern and western part of this state, should pass into the river St. Lawrence, even though the inhabitants of Canada were called citizens.

This, however, is not the most interesting view in which the capture of Canada is to be considered. It is clear, that an expedition for that purpose, whether more or less successful, would be destructive of commerce, productive of an oppressive land-tax, and that, in its consequences, it would, at least, endanger our political freedom. The project of taking Canada implies, that we have become the allies of France, for the purpose of subjugating England. In this case, the two first allegations are inevitable. Every ship that we have afloat, must be taken by the British navy, our ports blockaded, and our commerce ruined. In the stead of a revenue from imports, we must have a land-tax : the facility of paying that tax, when the farmer cannot sell his produce, may be readily calculated.

Let us now suppose, that we have gained every thing we contended for ; that we have distressed England, by cutting off her supplies from Canada, by taking none of her manufactures, and by sending her no provisions nor raw materials ; that she has sunk under a long struggle ; has been compelled to make peace with France, and has given up the command of the ocean ; is there a man living, who thinks that our situation would then be desirable ? It is a known axiom in France, that no part of the empire can be alienated. Necessity may occasion a treaty by which a province or colony shall be ceded, but the claim of the empire, to that province or colony, remains unimpaired. And it may be recovered by stratagem or by war. It follows, that before peace is concluded twelve

months, between France and England, we shall hear that France sets up her claim to Canada, a claim that will not be disputed. It cannot be forgotten, that on a late occasion, France and Spain claimed all the western country beyond the Ohio, and a good part of the state of Kentucky. Bonaparte claims all Spanish America, by the late grant of Charles the fourth, and his son Ferdinand. Both the Floridas are included in that grant. When we are enclosed by a line of French garrisons, from Quebec to St. Augustine, our situation will not be enviable. When England has submitted to the yoke, and there is not a civilized nation on the face of the earth, except the United States, that has any pretences to freedom, it is not very probable, that we shall long be suffered to remain an exception to the general rule. If we experience any marks of gratitude, for having assisted in the conquest of England, we shall be more fortunate than the king of Prussia and other auxiliaries of France. But the mind sickens at the prospect. Every feature of this project is so strongly marked by passion, or a departure from the common dictates of prudence and sound policy, that the reader claims an apology for the mention that has been made of the subject.

I was speaking of canals, intended for the general benefit of our fellow citizens ; canals that, without any dispute, would contribute greatly to the prosperity of this city, to the prosperity of this state, and to the revenue of the United States. Few measures have so urgent a claim on the attention of government.

MERCATOR.

X.

ADDITIONAL OBSERVATIONS on NAVIGABLE CANALS,
Addressed to the Editors of the Register, by AN OB-
SERVER.

SOME months ago, I submitted to the consideration of our fellow citizens, some observations on the subject of navigable canals. I took the liberty, on that occasion, to recommend a canal, that should extend from lake Erie to the navigable waters of Hudson river. I knew that the route I then proposed was different from that which had been deemed the proper one, but I stated my reasons for preferring a canal of greater length than had hitherto been mentioned. I was not aware that the commissioners of the general assembly had, at that very time, gone over the ground that I had been recommending, and that they had ordered a survey and level of the whole to be made. I have lately been favoured with a sight of that survey, by which it is fully established, that the proposed canal is not only practicable, but that it may be executed at a very moderate expense, considering its length. It is well known that a communication has already been made between Schenectady and the Seneca lake, by canals or natural water courses. That communication, at present, is neither cheap nor convenient. But the fact is well established, that the communication may be made in a proper manner. For this reason, I shall only describe the ground, or the levels of the ground, from lake Erie to Seneca lake. The distance between those lakes is one hundred miles.

Tanawanda swamp, to the eastward of lake Erie, is

the highest ground through which the proposed canal is to pass. Its greatest elevation, at the distance of twenty-seven miles from lake Erie, is only ten feet above the level of the lake. There is a constant descent from the head of Tanawanda creek to Seneca lake, as follows, viz.

From Tanawanda to Genesee creek, above the upper falls, thirty-two miles: the descent ninety-one feet. From Genesee river to Seneca lake, thirty-eight miles: the descent is seventy feet. The whole distance from lake Erie to Hudson river, below the Cohoes, is two hundred and eighty miles.

From this survey it appears, that no difficulty can arise in making a navigable canal, through the whole space that has been mentioned. It is only to be determined, whether the state of New-York, or rather the United States, will enter with spirit upon the business. I have said, the United States rather than the state of New-York, because the United States have, by far, the greatest interest in that business. The Holland land-company owned a great tract of land in the western part of this state. Part of that land is sold, but not paid for. The heirs of Sir William Pulteney are in the same predicament. The proposed canal would enable them to sell the remainder of their land, and to collect their debts. They would doubtless contribute liberally towards the expense of that canal. But the United States, as I hinted on a former occasion, have a capital stake in such a canal. It would be worth many a million to them. In a word, that canal would be a chain, if the expression can be admitted, by which the western country would be firmly attached to the Atlantic states. The immense wilderness that lies to the northward of the

river Ohio, will be settled in a short time. If the United States do not give adventurers a title to the lands they pitch upon, they will settle on them without a title. The United States have sold, within the last ten years, somewhat more than three million acres of land, at a little more than six millions and a half of dollars ; but one fourth part of the whole price is yet to be paid ; and it is, at least, probable, that many families have settled in the western country, who, having no cash in hand, have not obtained titles. The arrears due for lands sold, and the number of settlers without titles, may be expected to increase daily. The amount will be great before fifty millions of acres are disposed of, and that is not half the land that is to be sold. If the settlers were enabled to pay for the lands, by the fruits of their industry, the lands would soon be disposed of, and honestly paid for. The reader will not forget, that one million of dollars received for lands sold this year, is better than two millions that may be got for lands sold twelve years hence ; for any sum, at six per cent., doubles itself in less time. Beside the benefit that government would derive from the circumstance of being enabled, by the help of a canal, to sell those lands expeditiously, they would also be enabled to avert a danger that might be fatal to the union. A vast body of people, settled in the western country, many of them unable to pay their debts, and many more of them settled on wild lands, without a title, might be tempted to settle their accounts and titles by separating from the union, and declaring themselves independent. The temptation would be great, and, if they should adopt that measure, I do not see what could be done with them. An army sent among them, would find no money there, and they would neither propose to kill nor remove the inhabitants. We know

how much trouble a handful of illegal settlers, on the Susquehannah, caused the state of Pennsylvania. And we know, that a few people, in the district of Maine, who have settled on fifteen or twenty thousand acres of land, without a title, are, at this time, giving much trouble to the state of Massachusetts : bidding defiance to legal process, by killing or wounding civil officers. If such difficulties occur, in bringing people to order, who are surrounded by orderly citizens, what is to be done with a vast body of people, who have an interest in the opposition ? I contend that the expense of a million or two millions of dollars, in making a canal, by which we should preserve the affections of our western brethren, and enable them to pay their debts, would be a measure of perfect frugality and prudence.

AN OBSERVER.

R E V I E W.

ART. I. *FACTS and OBSERVATIONS relative to the Nature and Origin of the PESTILENTIAL FEVER, which prevailed in this city, in 1793, 1797, and 1798. By the College of Physicians of Philadelphia.* Philadelphia, Dobson, 8vo. pp. 52. 1798.

ADDITIONAL FACTS and OBSERVATIONS relative to the Nature and Origin of the PESTILENTIAL FEVER. By the College of Physicians of Philadelphia. Philadelphia, Dobson, 8vo. pp. 99. 1806.

WHEN the malignant pestilential fever first re-appeared in the United States, in 1793, after a period of thirty-one years, the College of Physicians of Philadelphia, in common with other physicians, soon found that it was a disease unusual and unknown to most of them. They observed that it differed essentially from every kind of fever they were acquainted with; that it began from a point, from which it gradually progressed, and that it was communicated to such as were within the sphere of its action; that the violence of the feverish symptoms generally ceased on the third day of the attack; that it was very frequently followed by a yellowness of the skin, and, in fatal cases, by a vomiting of black matter, resembling coffee-grounds; and that it generally terminated within seven days: also, that the usual treatment of autumnal

remittents, by the Peruvian bark, &c. would not apply to this fever. These peculiarities marked it as a new fever, and the first appearance of it, near the river, led to the supposition, that its origin, as well as symptoms, were foreign to our country. Subsequent observations have, in the opinion of the college, fully confirmed these sentiments. They have, therefore, acted on this ground, and the publication before us is made with a design of substantiating these opinions. It will be found, on perusing the work, that the college have merely given such opinions and facts as they believed were suited to justify their conclusions, and that they have, in no one instance, entered into controversy. They profess to be actuated by a desire to seek after and disseminate truth, not to obtain a victory over any who may differ from them.

In page 4, of *Facts and Observations* relative to the Nature and Origin of the Pestilential Fever, which prevailed in Philadelphia in 1793, 1797, and 1798, they say,

“About the latter end of July and beginning of August, 1793, a fever of a new and very alarming nature prevailed in this city. It first appeared in Water-street, between Mulberry and Sassafras-streets; and all the cases of this fever, were, for two or three weeks, evidently traced to this particular spot. A considerable part of the city, Northern Liberties, and district of Southwark, became gradually infected, and it was not until the coming of the frost, that the disease subsided, after having proved fatal to nearly five thousand persons.

“The peculiarity of the symptoms, the remarkable inefficacy of remedies generally used for diseases which commonly occur in the same season of the year, with somewhat similar symptoms, its great mortality, and contagious nature, sufficiently evinced, that a very unusual disease existed amongst us.”

About the latter end of July, 1797, the malignant pestilential fever again appeared in Philadelphia ; where it appeared a third time, with increased violence, about the same period, in 1798. In support of their former opinions, of the nature and origin of the fever, the college now say, (pages 24, 25, 26, of *Facts and Observations*,)

“When we reflect, that Philadelphia is one of the cleanest, best aired cities in the union ; that Kensington, Chester, and Wilmington, enjoy all the advantages of country air ; that no possible improvement with respect to water or ventilation, can make our situation more eligible than that of these places ; and particularly when we consider, that the situation of Wilmington precludes all idea of a defect of ventilation, and that New-York, being furnished with water brought from a distance, the bad quality of our water cannot be the cause. When we observe that our city has become more healthy, by the salutary improvements made in it ; that the number of our common native diseases, such as autumnal remittents and dysenteries, is greatly diminished : when we also observe, that it is only in sea-ports that this fatal pestilential fever prevails ; why should we refuse, in this particular instance, candidly to deduce effects from causes, and to admit, that although local circumstances may favour the spreading of such diseases, yet, as they can always be traced to the shipping or its neighbourhood, or to persons or materials connected with shipping, that there are the strongest reasons to conclude that they are introduced from thence ?

“From the preceding facts and observations we think the following conclusions may be justly drawn.

“That the contagious malignant fever which appeared in this city in the years 1793, 1797, and 1798, is essentially different from the bilious remittent fever of this climate.

“That the contagious malignant fever of those years is essentially the same, with the disease called the *yellow-fever* in the British, and the *maladie de Siam*, in the French West-India islands.

"That the *yellow-fever* or *maladie de Siam* prevailed in a very great degree in the different ports of Hispaniola, during the last year, and more particularly in Port-au-Prince, Jeremie, and Cape-Nichola-Mole.

"That a very great number of vessels arrived at this city from those ports, during the months of June and July 1798.

"That this disease has been several times introduced into North-America, by contagion retained in the wearing apparel of persons who had died in the West-Indies, although no person was sick on board at the time the vessel arrived in this country; and that we have demonstrated, as fully as it is possible in a matter which is not obvious to our senses, that the contagion of the fever of 1798 was imported from Jeremie, Cape-Nichola-Mole, or Port-au-Prince, in one or more vessels, which arrived here in June and July last."

In an appendix to the Facts and Observations, a number of documents are given, in support of the doctrines laid down. The discussion of the doctrines, assumed by the college, had, it is well known, been freely and generally made. Many of their positions had been called in question, and, deeming it interesting to what they believed to be essential to the public welfare, they published, in 1806, a number of "Additional Facts and Observations relative to the Nature and Origin of the Pestilential Fever." The consideration of these, for want of room, we must necessarily postpone to our next.

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ART. II. *An Inaugural Dissertation on STONE IN THE BLADDER, submitted to the public examination of the Faculty of physic, under the authority of the Trustees of Columbia College, in the state of New-York, the right Rev. Benjamin Moore, D. D. president : for the degree of Doctor in medicine, on the 13th day of November 1810. By HENRY U. ONDERDONK, A. M. member of the Royal College of Surgeons, London. New-York. 8vo. pp. 44. T. & J. Swords. 1810.*

An Inaugural Dissertation on the Medical virtues of the WHITE OXYDE OF BISMUTH, with some preliminary observations on the chemical properties of that metal. Submitted, &c. on the 13th day of November 1810. By SAMUEL W. MOORE, A. B. New-York. 8vo. pp. 39. T. & J. Swords. 1810.

WHEN an author voluntarily offers himself to the public, it becomes us to inquire with a rigid impartiality into the utility of his labours, and the manner in which they are executed. But with respect to another class of writers, who may be considered as performing no more than an indispensable duty, and whose compositions are published in compliance with a collegiate statute, it is sufficient barely to mention the subject of their exercises, and to notice such facts or circumstances as may appear of special moment.

We shall not on the present occasion enter upon the consideration of a long agitated question, what particular advantages or disadvantages result to medical science from our seminaries of learning, permitting those exercises

to be published in the English language, which are to furnish evidence of their author's classical learning, as well as professional attainments. Believing as we do, that collegiate distinctions are honourable, so far only, as they are purchased by solid and extensive acquirements, we hope the day is not far distant, when a tolerable acquaintance with the learned languages, will be considered as essentially necessary to every candidate, for the degree of doctor in medicine. Such acquirements will be best evinced by a certain number of examinations, being conducted in the Latin language, and by the publication of a Latin thesis.

MR. ONDERDONK while in London, having had frequent opportunities of observing the use of the Bistoury, in the operation of removing the stone from the bladder, was induced, from a conviction of its superiority over other instruments, to make choice of Lithotomy, as the subject of his inaugural dissertation; especially, as it afforded him a full opportunity of making known the peculiar advantages which that instrument possesses. Introductory to the more immediate objects of his dissertation, Mr. Onderdonk has given a general history of the disease, the recent arrangements which have been made of urinary calculi, according to their chemical analysis, and an account of the most approved methods of operating for the stone. He then concludes with some remarks on instruments, in which he confines himself chiefly to a comparison between the bistoury and the gorget. The thanks of the profession are due to Dr. Onderdonk, for his endeavours to make known and extend the advantages resulting from the use of that instrument; an invention which cer-

tainly adds to the reputation of its author, Mr. Thomas Blizard, one of the surgeons of the London Hospital.

Dr. Onderdonk's observations on this part of the subject we subjoin, accompanied with an engraving of the bistoury.

"INSTRUMENTS.

" Certain accidents not unfrequently occur during the operation, which should make the surgeon very careful in his choice of instruments. Some of these untoward occurrences may be the effect of a want of anatomical knowledge, or of proper caution. But it is evident, that some must be occasioned by using a faulty instrument. My remarks on this head shall be entirely confined to a comparison between the gorget and bistoury. These are the instruments which chiefly divide the opinions of surgeons at present.

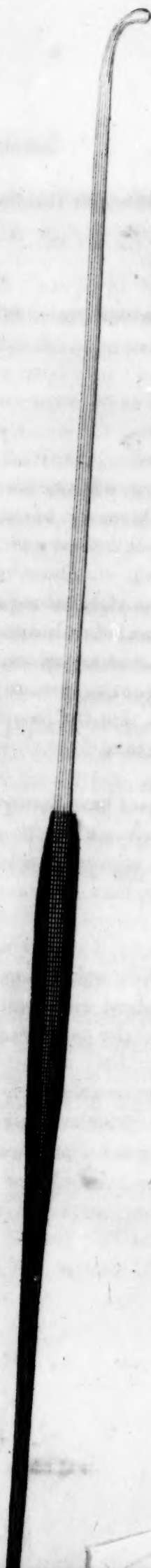
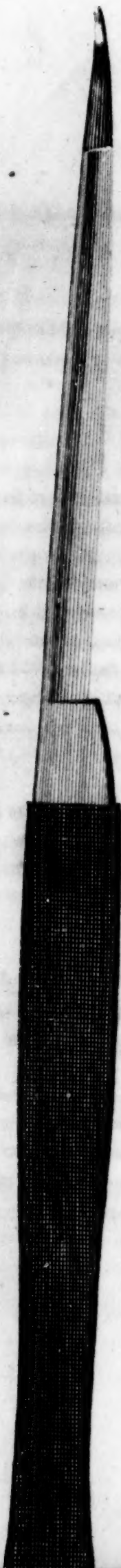
" The accident most generally feared, is the thrusting the gorget between the bladder and rectum, in making the second incision. This, it may be said, cannot take place if the instrument be passed in the direction of the axis of the bladder. As I have not witnessed the occurrence, I cannot say whether this point has been attended to. But it has happened in the hands of surgeons who had a large share of public confidence, and whom we cannot reasonably suspect of deficiency. The accident is not so unfrequent as has been imagined. Mr. C. Bell relates that he has known it in two cases ;* Mr. A. Cooper in his lectures, states, that 'near a dozen' instances have come within his knowledge ; and I have myself been informed of others.

" This occurrence has been explained by Mr. C. Bell, from some appearances observed on the dead body. 'The gorget had not gone off the groove : it had only not cut the neck of the bladder, it had pushed the prostrate gland onwards upon the staff, and had not pierced the neck of the bladder nor the prostate gland.'† Mr. J. Bell probably has this explanation in view, when he speaks of forcing 'off the neck of the bladder and prostrate from the urethra ;' but he also thinks it

* Operat. Surg. vol. 1. page 344.

† Ibid.

*Bistoury for
Lithotomy.*



‘unquestionable that the gorget is often plunged among the viscera.’* The probability is, that all these varieties of the accident may occur.

“ The explanation of the Bells would place the fault of such an accident rather in the instrument than in the operator. And indeed, whatever explanation we adopt, it must be evident, that the gorget is very liable to cause such an occurrence ; not to say that it appears calculated for it. A kind of curve is described in thrusting it in, which must make it act with obvious disadvantage ; its edge, striking obliquely, will probably lacerate as many fibres as it cuts. In the use of the bistoury, however, no such occurrences take place. It is so small that it passes with the readiness of a sound, and as the incision is made in withdrawing the instrument, it is impossible that the prostrate can yield before its edge. Not to mention that the edge of a knife can be made and kept keen with far greater ease than that of a gorget, and will of course be better calculated to make a real *incision*. We cannot suppose it possible, but by the grossest ignorance or inattention, that the *bistoury* can be literally pushed between the bladder and rectum.

“ Cases have occurred, in which the staff has been bent by an over-attention to keep the beak of the gorget in its groove. In the use of the bistoury, this is scarcely possible ; it enters with such facility, that no *force* is requisite to keep its beak in contact with the staff.

“ The gorget being an instrument of no inconsiderable bulk, must be wedged with some firmness in the wound it makes. This will prevent the operator from feeling with accuracy when it has entered the bladder ; or rather, (as the flow of urine will ascertain this) he will not be able to command the force with which he thrusts it onward. This accident is admitted by ‘those who prefer the gorget, and regard it as the ultimate improvement of this operation.’ It has occurred to surgeons whose caution or knowledge we have no reason to doubt, and it must therefore be, at least in part, attributed to the instrument. I need hardly add, that the bistoury is free from such an imperfection ; it passes like a probe, and is as easily regulated by the surgeon ; and even were it *thrust* in, it would be scarcely more liable to pierce the bladder than a sound.

* Smith's Abridgment, pages 186, 187.

"The above accident may perhaps be attributed to the bladder's contracting upon the edge of the gorget. This edge, in every form of that instrument and those analogous to it, projects; which projection, if the stone be not between it and the coats of the bladder, may very readily cut through the latter. It is evident that the bistoury is not liable to this accident, as its edge does not project.

"It may perhaps be objected to the bistoury, that it gives no limit to the incision. It truly does not; and to a surgeon even moderately expert, this would be a recommendation rather than an objection. I am not indeed certain that any will cavil; if they should, they must be referred to the *dead* subject, till they can acquire steadiness sufficient to handle a knife.

The gorget, it will be urged, unites a director with a cutting instrument. It was before stated, that the advantage of such a director was very questionable. If the wound be sufficiently free, and the patient's struggles not unusually violent, the finger upon the staff, and the forceps upon the finger, will fully suffice. If the patient be very fat, his bladder may be too far from the external perineum, to be reached by the finger. Or the surgeon, however expert, may possibly lose the direction of the incision. In this case, a blunt gorget will be an useful instrument. But the occasion for a director will be very rare, and the bistoury in all other cases will amply suffice.

"I am sensible, that although the knife is preferred by surgeons of great eminence, the gorget has advocates equally great. With so even a defence on both sides, it might be deemed presumption to offer an unreserved decision. So far, however, as I am acquainted with the opinions of each, I am disposed to think that the bistoury is liable to fewer objections than any other instrument with whose use I am acquainted.

"Thus far the knives both of Mr. Blizzard and Mr. Cooper have been equally advocated; and from the similarity of principle, it would be difficult to choose between them. There are, however, some *minutiæ* in that of the former, which will make it, on the whole, preferable; or perhaps I may think so, from being accustomed to its use on the dead body. As its beak projects a little from the upper part

of its point, it may be introduced more nearly parallel with the staff. As it is rounded for near an inch from the beak, it will follow with greater certainty the canal of the urethra, and will 'make assurance doubly sure,' that the parietes of the bladder will not be cut. As also it is straight, it is better calculated to make a ready incision.

"These instruments have both been repeatedly used with success; so that no circumstance, either in theory or in experiment, is wanting to embolden a surgeon in adopting them. Of operators, however, who have long used the gorget, and who are satisfied with their practice, it would be unreasonable to ask a change. A younger surgeon will balance in his own mind the comparative merits of the two; and as he has 'proved' neither, will adopt that in which he places the greatest confidence. The first duty of every practitioner is to render operations unnecessary. When these efforts are unavailing, he is to free them from danger as much as possible. Anatomical knowledge, and well established theory, are undoubtedly the most important means of effecting the latter; but it must be evident that there is a preference among instruments—in what operation more than in lithotomy? It has been advanced, that the gorget is a knife; if so, it is a very clumsy one. The use of such an argument is a tacit consent to the superiority of the latter instrument. And I know not what higher praise could be bestowed upon the bistoury, than retorting, that it is not a gorget." p. 39—44.

We unwillingly postpone the notice of Dr. Moore's Dissertation to our next number, for want of room.

DOMESTIC INTELLIGENCE.

LETTER *from* CADWALLADER D. COLDEN, *Esq. to Dr.*
DAVID HOSACK, *concerning an Original Paper of Sir*
ISAAC NEWTON.

New-York, December 3d, 1810.

DEAR SIR,

I BELIEVE I mentioned to you, as I have done to several other gentlemen, that there were among the papers of my grand-father some original letters of Sir Isaac Newton. I have taken a leisure moment to examine a large box, which has lately come to my hands, which I was informed contained them. I have found a manuscript, which has all the appearance of being an original, from the hands of the great philosopher; but, from an attentive consideration of this manuscript, I am induced to believe, that it can only be a copy, which has been made by some one, for the use of my grandfather.

I now send you the manuscript above referred to. It appears upon the out-side to have been addressed to my grand-father, in the form of a letter, but the superscription is evidently in a different hand writing from the inside. Its date, more than any other circumstance, leads me to believe, that it cannot be an original. My grandfather did not come to this country till 1710. He was then very young, and was not known to the learned men

of Europe till long after the date of his manuscript; so that it is extremely improbable, that he should have had a correspondence with Sir Isaac Newton, upon philosophical subjects, at so early a period.

Whether the letter be an original or not, it may be a matter of sufficient curiosity to deserve a place in the Medical Register. If you should think so, it is much at your service, for the purpose of inserting in that work. You will oblige me by returning to me the manuscript which I now enclose.

I am, Sir, with great regard and respect,

Your obedient humble servant,

CADWALLADER D. COLDEN.

*Original Letter from Sir Isaac Newton.—Dated Cambridge,
February 28th, 1678-9.*

SIR,

IT being only an explication of qualities, which you desire of me, I shall set down my apprehensions in the form of suppositions, as follows. And first, I suppose, that there is diffused through all places, an ætherial substance, capable of contraction and dilatation, strongly elastic, and, in a word, much like air in all respects, but far more subtile.

2dly. I suppose this æther pervades all gross bodies, but yet so as to stand rarer in their pores than in free spaces, and so much the rarer as their pores are less.

I shall set down one conjecture more, which came into my mind now as I was writing this letter. It is about the cause of gravity. For this end, I will suppose æther to

consist of parts, differing from one another in subtilty, by indefinite degrees : that in the pores of bodies there is less of the grosser æther, in proportion to the finer, than in open spaces ; and, consequently, that in the great body of the earth, there is much less of the grosser æther, in proportion to the finer, than in the regions of the air : and that yet the grosser æther, in the air, affects the upper regions of the earth, and the finer æther, in the earth, the lower regions of the air, in such a manner, that from the top of the air to the surface of the earth, and again from the surface of the earth to the centre thereof, the æther is insensibly finer and finer. Imagine now, any body suspended in the air, or lying on the earth ; and the æther being, by the hypothesis, grosser in the pores which are in the upper parts of the body, than in those which are in its lower parts, and that grosser æther being less apt to be lodged in those pores, than the finer æther below, it will endeavour to get out and give way to the finer æther below, which cannot be, without the bodies descending to make room above for it to go out into.

From this supposed gradual subtilty of the parts of æther, some things above might be farther illustrated, and made more intelligible ; but, by what has been said, you will easily discern, whether in these conjectures there be any degree of probability, which is all I aim at. For my own part, I have so little fancy to things of this nature, that had not your encouragement moved me to it, I should never, I think, have thus far set pen to paper about them. What is amiss, therefore, I hope, you will the more easily pardon, in

Your most humble servant and honourer,

ISAAC NEWTON.

Dr. Currie's intended work.

We learn with great pleasure, that Messrs. J. and A. Y. Humphreys have in the press, and will shortly publish, a new medical work, from the pen of Dr. William Currie, of Philadelphia, entitled "A Description of the Diseases most prevalent in the United States of America, during the different seasons of the year; with a circumstantial account of the remedies, and method of treatment, which have been found most efficacious: being the result not only of the author's own experience, but of the experience of several physicians of established character and distinguished abilities, residing in the different states: including the substance of all the latest, and most important improvements which have been made in the treatment of similar diseases in other countries."

We are informed by WILLIAM LEE, Esq. the American consul at Bordeaux, that the analysis of the Ballston water, which was given in the first number of the Register, page 41, and which is believed to be the most correct of any that has been published, was made by Mons. CAZALET, a celebrated teacher of chemistry at Bordeaux, and particularly distinguished for his skill in practical analysis.

Griscom's Lectures on Natural Philosophy and Chemistry.

We think it proper to state, for the information of our readers, that Mr. J. Griscom is actively pursuing the plan of instruction noticed in our last number. His classes both on Natural Philosophy and Chemistry, are numerous and respectable. His apparatus is of the latest and most approved construction, and finished in the best manner.

It is the object of Mr. G. we understand, to render his Lectures, if possible, subservient to the increase of a more general taste in this city, for the rational and instructive entertainment, which those sciences afford. It is accordingly his intention to supply himself, from time to time, with every suitable addition to his apparatus, and to avail himself of such means, as will enable him, to describe in his Lectures, the latest improvements and discoveries in chemistry, and the subordinate arts.

That view of nature, which is presented to the attention of an audience, by a proper illustration of the general doctrines of mechani-

cal and chemical philosophy, is certainly of the most interesting kind, and the best suited for a popular course ; and we are pleased to find that Mr. G. is attended by a respectable number of ladies as well as gentlemen. Lectures of this kind, in public institutions, are frequented by ladies of the first respectability, in the most polished cities of Europe, and we know of no solid argument, that can be opposed to the practice. The progress of chemistry has of late years been rapid beyond example, and the *experiments* it affords, are exceedingly beautiful, and we think well calculated to *amuse*, as well as *instruct*, a fashionable audience. We observe it is Mr. G's practice to suggest to his hearers, such proofs of a natural theology, as many of the subjects of which he treats so strikingly present.

By the polite attention of DAVID BAILIE WARDEN, Esq. Consul General of the United States, at Paris, we have been favoured with a number of the latest productions of the French press, besides several papers on medical and philosophical subjects. We have been long acquainted with the talents and literary acquirements of Mr. Warden, and gladly avail ourselves of this opportunity of remarking, that besides many original papers which have been presented to the public, from the pen of Mr. Warden himself, that gentleman, while in the performance of the duties which his official station required, has also zealously embraced every opportunity which occurred, of conveying to his literary correspondents in the United States, the earliest intelligence of every thing he considered new or interesting to the country from which he received his consular appointment. We hope his example will be followed by all those whose public stations afford them similar opportunities of serving their country.

Observations on the Weather of the City of New-York, for the months of October, November, and December, 1810.

OCTOBER.

THE weather during the first six days of October, was clear, and unusually warm for the season ; wind chiefly from the s. w. On the seventh it became overcast, and

some rain fell accompanied with a high wind, from the southward. It now became much cooler, and on the 12th the mercury in the thermometer stood as low as 38 at 7 A. M. From the 8th to the 13th, it was clear and pleasant; though considerably cooler. On the 13th and 14th, a great quantity of rain fell, with a heavy wind from the N. E. The remaining days of this month were for the most part, fair and agreeable: wind chiefly from the N. W. and S. W. On the 31st, however, some rain fell, and the thermometer stood at 7 A. M. at 33, at 3 P. M. at 35, and at 7 P. M. at 32. This was the coldest day experienced in this month.

NOVEMBER.

The weather at the commencement of November, exhibited all the appearances of winter. On the 2d day there was a violent storm, accompanied with a N. E. wind, and there fell about seven inches of snow. On the 3d, the thermometer stood at 7 A. M. at 23, at 3 P. M. at 31, and at 7 P. M. at 29. The weather again became overcast on the 9th, on which day, and on the two succeeding, there fell a great quantity of rain accompanied with a violent wind chiefly from the E. The rain continued on the 12th, 13th, 14th, 15th, and 16th, though more moderate, excepting on the night of the 14th, when it fell in torrents. On the 17th and 18th it was quite pleasant, with a gentle wind from the N. W. after which we experienced another heavy rain, with wind from N. E. On the 23d we had a fall of snow of about two inches and a half. The weather for the remaining days of the month was either overcast, cloudy, or rainy: seldom fell a greater quantity of rain in any month than during the present. The damage done to the city was immense; several buildings

were undermined and fell down. We experienced a consequent increase in the current of our rivers ; and remarkably high tides. Considerable damage was also sustained by the shipping in the harbour, and off the coast.

DECEMBER.

The 1st and 2d days of this month were clear and pleasant. On the 3d a small quantity of snow fell, accompanied with a N. E. wind, at which time the thermometer stood at 32. On the 4th it became clear and agreeable, and continued so till the 11th, on the morning of which day we again had more snow : the five succeeding days were clear, accompanied with wind from the westward, during which time the mercury in the thermometer was generally 8 degrees below the freezing point. On the 16th the wind changed to the N. W. and increased in violence attended some rain ; the weather for the seven following days was extremely disagreeable, being either overcast, foggy, or rainy. On the 23d and 24th days it became pleasant and quite mild for the season. The thermometer stood at 7 A. M. at 31, at 3 P. M. at 38, and at 7 P. M. at 36. The weather for the remaining days of this month was for the most part mild, though often either overcast or cloudy. On the night of the 30th, however, it commenced snowing, and continued until the afternoon of the 31st, when a considerable change in the temperature of the weather was experienced. Wind from the N. W.

Observations on the Diseases of New-York, for the months of October, November, December, 1810.

The diseases we have already recorded as more especially belonging to the summer season, viz. *diarrhæa*, *cholera*, *dysentery*, *intermitting*, *remitting*, and *typhus*

fevers, continued to prevail throughout the greater part of the month of October ; but as the season advanced, diseases of an inflammatory nature appeared, and owing to the sudden and frequent changes of weather, and the great quantity of rain with which both city and country have been deluged, they have been more than usually prevalent during the last two months. Accordingly, *catarrh*, *pleurisy*, *peripneumony*, and *rheumatism* make up the greater part of the catalogue of our diseases during the period mentioned.

But in the weekly obituary, we continue to observe *consumption* at the head of the list. Notwithstanding the boasted ptisans of lichen islandicus, alcornoque, and other remedies industriously recommended as specifics in consumption, this disease in most cases still obstinately resists the best efforts of our art.

We have also had occasion during the last three months to record many cases of *apoplexy* and *palsy*. For the most part they occurred in advanced life ; but in some few instances these diseases also attacked persons between thirty and forty years of age. In the latter cases they were manifestly induced by general plethora of the sanguiferous system, the effect of free living and want of exercise. Bloodletting, purging, blisters, and abstinence have been the remedies most successfully employed. We cannot however but remark, that we have witnessed much injury from the very copious and repeated bleedings that are prescribed by many of our practitioners, in these diseases : even in the most athletic habits, such sudden evacuations and consequent prostration of the powers of life, cannot be justified either by reasoning or practice. The timid conduct of others, who object altogether to evacuations

by the lancet in those diseases when they occur at an advanced period of life, is equally to be reprobated. Although the system may be debilitated by age, it should be recollected that the secretions are also impaired from the diminished exercise at that period of life, and that an accumulation takes place in the larger vessels especially in the venous system. Where this plethora manifests itself in the brain by producing a general disinclination to motion and propensity to sleep, inability to articulate distinctly, or a sense of numbness in the extremities, which symptoms not unfrequently precede a fit of apoplexy or palsy, the lancet should be employed, followed with moderate evacuations by the bowels. But in such cases we have had reason to observe that they are too frequently neglected.

Convulsions, according to our public records, have also been attended with more than usual mortality during the last three months. In our private practice we have had occasion to witness many cases of this disease; but in those cases the convulsions readily yielded to the use of laudanum and the warm bath, administered during the paroxysm. These were succeeded by the use of such other remedies as the probable nature of the cause producing the disease appeared to point out: viz. the free division of the gums when inflamed and distended by teething; the evacuation of the stomach and bowels when the irritation appeared to originate in the intestinal canal; and in cases of worms, by the use of elixir proprietatis, occasionally administered as a laxative, followed by a course of chalybeates.

To Correspondents. Communications have been received from Col. Williams, Dr. H. U. Onderdonk, Dr. Arnell, Mr. Spafford, Dr. W. Currie, Mons. Magendie, and Dr. Delile but are necessarily postponed

Erratum. In Dr. Hosack's paper on *Cnicus Arvensis*, in second number, page 212, line 7, for Professor Willdenow, read Persoon.